INSTRUCTION MANUAL

REGULATED POWER SUPPLIES

MODEL LM
D PACKAGE

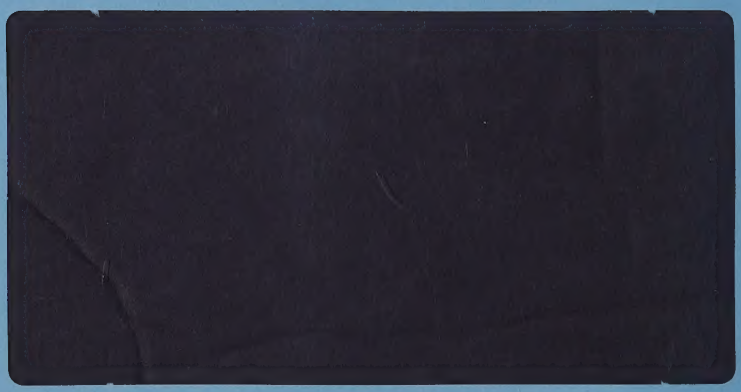
THIS MANUAL APPLIES TO UNITS

BEARING SERIAL NO. PREFIXES A-F

MP MASTER
MA28766

LAMBDA

LAMBDA ELECTRONICS MELVILLE, L. I., N. Y.



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This manual provides instructions intended for the operation of Lambda power supplies, and is not to be reproduced without the written consent of Lambda Electronics.

LAMBDA ELECTRONICS MELVILLE, L.I., N.Y.

MAIN PLANT TELEPHONE: 516 MYrtle 4-4200

TABLE OF CONTENTS

SECTION	PAGE
SPECIFICATIONS AND FEATURES	1
Mounting	2
Accessories	2
Model Options	3
THEORY OF OPERATION	4
General	4
Functional Description	4
OPERATING INSTRUCTIONS	6
Basic Mode of Operation	6
Mounting	6
Connections for Operation	6
MAINTENANCE	8
General	8
Trouble Analysis	8
Checking Transistors and Capacitors	8
Printed Circuit Board Maintenance Techniques	8
Trouble Chart	9
Performance Check	10
Adjustment of Calibration Control R17	10
SERVICE	12
PARTS ORDERING	12
PARTS LIST	D-1

SPECIFICATIONS AND FEATURES

The following specifications apply for all Lambda D package LM power supplies. Specification exceptions noted here relate to models incorporating model option "Y" and/or "T". Performance specifications do not change for models with suffix "R", e.g., LM-D2-R unless the models also include model options "Y" and/or "T" e.g., LM-D2-YR; for these models the appropriate specification exceptions also apply.

NOTE: Specifications in italics apply only for Lambda models with a "Y" suffix, e.g., LM-D2-Y. AC INPUT specification with an asterisk *, applies only for Lambda models with a "T" or "V" suffix, e.g., LM-D2-YT.

DC OUTPUT--Voltage regulated for line and load

Voltage Range.... For voltage range see table I of pertinent model group.

Multi-Current Ratings.... Current ratings specified for each maximum ambient temperature apply over entire output voltage range, with input frequency 55-65 cps.
For input frequencies 45-55 at 105-132 VAC, 200-250 VAC, or 205-265 VAC, 40° current rating does not apply.
For input frequencies 360-440 cps, consult factory for current ratings.
For maximum current ratings at each ambient temperature see table I of pertient model group.

REGULATED VOLTAGE OUTPUT

Regulation (line)... Less than 0.05 percent plus 4.0 millivolts for input variations from 105-132 or 132-105 volts AC
... Less than 0.01 percent plus 1.0 millivolt for input variations from 105-132 or 132-105 volts AC

Regulation (load)... Less than 0.03 percent plus 3.0 millivolts for load variations from 0 to full load or full load to 0
... Less than 0.02 percent plus 2.0 millivolts for load variations from 0 to full load or full load to 0

Remote Programming

External Resistor... Nominal 200 ohms/volt output

Programming Voltage... One-to-one voltage change

Ripple and Noise... One millivolt rms; 3 millivolts peak-to-peak
....0.5 millivolt rms; 1.5 millivolts peak-to-peak with 60 cps input

Temperature Coefficient... Change in output voltage less than 0.03%/°C
... Change in output voltage less than 0.01%/°C

AC INPUT--105-132 volts AC at 45-440 cps; 300 watts+
+ With output loaded to full 40°C rating and input voltage 132 volts at 55-65 cps.
*... 200-250 volts AC at 45-440 cps ("T" option)
*... 205-265 volts AC at 45-440 cps or 187-242 volts AC at 45-440 cps ("V" option)

INPUT FUSE--"SLO-BLO" fuse F1 protects the AC input circuit. Overload of the supply does not cause fuse failure.

For fuse ratings see table I of pertinent model group.

OVERLOAD PROTECTION

Thermal.... Thermostat resets automatically when overtemperature condition is eliminated

Electrical... Within rated voltage range, an automatic electronic current-limiting circuit limits output current to approximately 110 percent of 40°C rated current for protection of load and power supply; for overloads approaching short circuit, both voltage and current decrease until at short circuit, current is reduced to a safe value except for models LM-234, LMD-0-14, 0-32, and 0-60 where output current remains limited to 110 percent of 40°C rated current at

OVERSHOOT--No overshoot of output voltage under conditions of power turn-on, power turn-off, or power failure.

INPUT AND OUTPUT CONNECTIONS--Heavy duty terminal block on rear of chasis

OPERATING AMBIENT TEMPERATURE RANGE AND DUTY CYCLE--Continuous duty from -20°C to 71°C ambient with corresponding load current ratings for all modes of operation, and all mounting positions.

STORAGE TEMPERATURE-- -55°C to +85°C

CONTROLS

DC output control... Voltage adjust control permits adjustment of DC output voltage via access hole located in nameplate.

REMOTE SENSING--Provision is made for remote sensing to eliminate effect of power output lead resistance on DC regulation.

PHYSICAL DATA

Size.....4-15/16" H x 7-1/2" W x 9-3/8" D

Weight .....20 lbs. net; 23 lbs. shipping wt.

Finish ..... Grey, FED STD 595 No. 26081

MOUNTING--Three surfaces, each with tapped mounting holes, can be utilized for mounting this unit. All LMD power supplies can be mounted with Top, Front, or Right Side facing up. Top, Front or Right Side must be in a horizontal plane. Refer to figure 9 for mounting details.

ACCESSORIES

Rack Adapters... Rack adapters LRA-4 and LRA-6, used for ruggedized mounting, with or without chassis slides, are available, as well as rack adapters LRA-3 and LRA-5 which are used for simple rack installations where chassis slides are not required.

Metered and Non-Metered Panels...Metered panels MP-3, MP-5 and Non-Metered panels P-3, P-5 are available for use with the Lambda rack adapters.

Blank Panels... Full-rack, half-rack and quarter-rack panels can be used with the Lambda rack adapters. The following chart lists the panels and rack adapters that can be utilized together.

Rack Adapter	BLANK PANELS			Metered/Non Metered Panel
	1/2 Rack	1/4 Rack	Full Rack	
LRA 3	LBP-20	LBP-10	LBP-40	MP-5, P-5
LRA 6	LBP-20	LBP-10	LBP-40	MP-5, P-5
LRA 4	LBP-50	LBP-60	LBP-30	MP-3, P-3
LRA 5	LBP-50	LBP-60	LBP-30	MP-3, P-3

Overvoltage Protector... Externally mounted, Overvoltage Protectors LMOV-1, LMOV-2 and LMOV-3 are available for use with Lambda LM power supplies.

MODEL OPTIONS

Suffix "T" Input Option... Standard LM power supplies are available for operation with 200-250 volt, 45-440 cps input.

Suffix "Y" High Performance Option... All Lambda LM power supplies are available with high performance specifications. See italicized entries under SPECIFICATIONS AND FEATURES.

Suffix "R" Fungus Proofing Option... Standard LM power supplies can be obtained with fungus proofing treatment with MIL V 173 varnish for all fungi nutrient components.

Suffix "V" Input Option... Standard LM power supplies are available for operation with 205-265 volt, 45-440 cps input or 187-242 volt, 45-440 cps input. See nameplate for AC input rating. See schematic diagram for rewiring of AC input.

Suffix "S" Option... Standard LM power supplies are available for use with Lambda Systems Power Sequencer or Systems Power Protector. All fixed voltage power supplies must be specified with the "S" option when used with the Systems Power Sequencer. On units with "S" option, R2 is replaced by a jumper.

THEORY OF OPERATION

GENERAL

The Lambda power supply consists of an AC input circuit and transformer; a bias supply consisting of an auxiliary rectifier, filter, and a zener diode regulator; and a main regulator circuit consisting of the main rectifier and filter, a series regulator, emitter follower drivers, an error amplifier, a current limit amplifier, an output voltage sensing circuit and an output current sensing circuit. In addition, certain models also contain a current sink circuit or a voltage amplifier circuit.

The circuit arrangement is shown in block diagram form in figure 7. The circuitry is discussed with reference to the block diagram and the schematic diagram.

FUNCTIONAL DESCRIPTION

Single phase input power is applied to transformer T1 through the input circuit containing thermostat S1, which protects the supply against overheating.

The main rectifier, a full-wave rectifier, provides the power which is filtered by capacitor C8 and then regulated via a series regulator and delivered to the output. Bias supply, half-wave, auxiliary rectifier CR7, provides voltage filtered by capacitor C7 and regulated by zener diode CR6 for current limit amplifier Q3 and error amplifier Q1, Q2 (or, as applicable, for voltage amplifier Q2). Zener diode CR1 and resistor R5, across the bias supply, provide a regulated temperature compensated reference voltage. Resistor R4 compensates for input voltage variations.

Operation of the voltage regulator circuit is determined by changes in the output voltage. A change in the output voltage is sensed by the sensing divider resistors which compare output voltage with the +S reference voltage. This provides an error voltage at junction of R2 and R3 (or, as applicable, R1 and R3) which is amplified by error amplifier Q1, and Q2 (and as applicable, by voltage amplifier Q2), and is current amplified by drivers Q5, Q6 (and, as applicable, by Q8, Q9). The amplified signal from the drivers controls the voltage across series regulator Q8-Q13 (or, as applicable, Q10-13), which functions as the active regulating element, restoring output voltage to the proper level.

*Current limit circuit operation is determined by changes in the load. Current limit amplifier Q3 samples load current through current sensing resistor R25. When the voltage drop across R25 increases compared with the preset voltage reference determined by R17 and R18, (and CR4 and Q4 where applicable), Q3 conducts. Thus, when the output current rating of the unit is exceeded, current limit amplifier Q3 conducts decreasing the current through drivers Q5, Q6, (and, as applicable by Q8, Q9) resulting in an increase of voltage across the series regulator and a decrease of the output voltage, effectively limiting the output current to a safe value. The current limit value is determined by the factory setting of current limit potentiometer R17.

+When operating conditions approach short circuit, the output voltage decreases. Since the voltage determined by R17 and R18 is proportional to the output voltage, when the output voltage decreases, Q3 is biased into turn-on at lower and lower load currents until output voltage decreases to zero and current decreases to a predetermined low value.

+The following theory only applies for units with current sink Q4.

When operating conditions approach short circuit, and output voltage value decreases below the minimum voltage rating, current sink Q4 saturates and the divider R17, R18, Q4, R19 becomes purely resistive with no regulated reference for current limit operation. With Q4 in saturation the voltage reference becomes proportional to the output voltage, i. e., decreases as the output voltage decreases. This permits Q3 to turn on at lower and lower load currents until output voltage decreases to zero and current decreases to a predetermined low value.

*The following theory only applies for units with voltage amplifier Q2.

Current limit circuit operation is determined by changes in the load. When load current increases above the rated current value, the voltage drop across current limit potentiometer R17 increases, turning on current limit amplifier Q3. With Q3 conducting, the current to driver Q5 decreases, limiting the base current to series regulator Q8-Q13, which results in an increase of voltage across the series regulator and a decrease of the output voltage, effectively limiting the output current to a safe value. The current limit value is determined by the factory setting of current limit potentiometer R17.

When operating conditions reach short circuit, the output voltage value decreases to zero and the current decreases to a predetermined current limit value and remains unchanged.

OPERATING INSTRUCTIONS

BASIC MODE OF OPERATION

This power supply operates as a constant voltage source provided the load current does not exceed the rated value at 40°C. For continuous operation, load current must not exceed the rating for each ambient temperature. *When load current exceeds 110% of 40°C rating, both voltage and current decrease until voltage reaches zero and the current at short circuit equals approximately 30 percent or less of the rated current.

*For models LM 234, LMD-0-14, LMD-0-32, LMD-0-60 output current remains limited to 110% of 40°C current rating.

MOUNTING

When using this unit as a mounted component, a cutout must be provided to permit free-flow of air through the unit. See figure 9 for cutout sizes and specific mounting details.

CONNECTIONS FOR OPERATION

NOTE: Make all connections to the unit before applying AC input power.

Ground Connections. The Lambda power supply can be operated either with negative or positive output terminal grounded. Both positive and negative ground connections are shown in the diagrams for all suggested output connections illustrated in this manual.

Connection Terminals. Make all connections to the supply at the terminal block on the rear of the supply. Apply input power to terminals 1 and 2; always connect the ungrounded (hot) lead to terminal 1.

The supply positive terminal is brought out to terminal 6; the negative terminal to terminal 4.

NOTE: When shipped from the factory, the supply is ready for use as a local-sensing constant voltage source. Jumpers are connected at the factory as shown in figure 3. Take care to remove the appropriate jumpers for load requirements that need different supply-load connections. Refer to the appropriate connection diagram.

Supply-Load Connections. The regulation of the supply at the load may change when connecting leads of practical length are used. To minimize the effect of the output load leads, remote sensing is used. Refer to figure 1 to determine voltage drop for particular cable lengths, wire size and current conditions. Lead lengths must be measured from supply terminals to load terminals as shown in figure 2.

Local-Sensing Connection, See Figure 3.

Remote-Sensing Connection, See Figure 4.

Programmed Voltage Connection Using External Resistor, See Figure 5. Discrete voltage steps can be programmed with a resistance voltage divider valued at nominal 200 ohms/volt output and a shorting-type switch. For continuous voltage variations, use a variable resistor with the same ohms/volt ratio in place of the voltage divider and shorting-type switch. Use low temperature coefficient resistor(s) to assure most stable operation.

Programmed Voltage Connection Using Programming Voltage, See Figure 6. The power supply voltage output can be programmed with an externally connected programming power supply. The output voltage of the programmed supply will maintain a one-to-one ratio with the voltage of the programming supply.

The programming supply must have a reverse current capability of 6 ma. minimum.

Alternatively, when supplies with less than 6 ma. reverse current capability are used, a resistor capable of drawing 6 ma. at the minimum programming voltage must be connected across the output terminals of the supply. This programming supply must be rated to handle all excess resistor current at the maximum programming voltage.

Operation After Thermostat Shutdown. The thermostat opens the input circuit only when the power supply output current exceeds the current rating specified for the operating ambient temperature, causing the unit to overheat. Do not exceed current rating specified for the operating ambient temperature. When the temperature of the unit decreases to a safe operating value, the thermostat will reset automatically.

Operation After Fuse Shutdown. Internal component failure is prevented by fuses which protect the components from damage caused by excessive currents. Fuses will blow when the maximum rated current value for the fuse is exceeded. Fatigue failure of fuses can occur when mechanical vibrations from the installation combine with thermally induced stresses to weaken the fuse metal. Many fuse failures are caused by a temporary condition and replacing the blown fuse will make the fuse protected circuit operative.

MAINTENANCE

GENERAL

This section describes trouble analysis routine, calibration and test procedures that are useful for servicing the Lambda power supply. A trouble chart is provided as an aid for the troubleshooter. Refer to the section on specifications and features for the minimum performance standards.

TROUBLE ANALYSIS

Whenever trouble occurs, systematically check all fuses, primary power lines, external circuit elements, and external wiring for malfunction before trouble shooting the equipment. Failures and malfunctions often can be traced to simple causes such as improper jumpers and supply-load connections or fuse failure due to metal fatigue.

Use the electrical schematic diagram and block diagram, figure 7, as an aid to locating trouble causes. The schematic diagram contains various circuit voltages that are averages for normal no load operation. Measure these voltages using the conditions for measurement specified on the schematic diagram. Use measuring probes carefully to avoid causing short circuits and damaging circuit components.

CHECKING TRANSISTORS AND CAPACITORS

Check transistors with an in-circuit transistor checker. If no checker is available, transistors can be checked with an ohmmeter that has a highly limited current capability. Observe proper polarity for PNP or NPN to avoid error in measurement. The forward transistor resistance is low but never ZERO; backward resistance is always higher than the forward resistance.

Do not assume trouble is eliminated when only one part is replaced. This is especially true when one transistor fails, causing other transistors to fail. Replacing only one transistor and turning power on, before checking for additional faulty components could damage the replaced component.

When soldering semi-conductor devices, hold the lead being soldered with a pair of pliers or a commercial heat sink device placed between the component and the solder joint.

> NOTE: The leakage resistance obtained from a simple resistance check of a capacitor is not always an indication of a faulty capacitor. In all cases the capacitors are shunted with resistances, some of which have low values. Only a dead short is a true indication of a shorted capacitor.

PRINTED CIRCUIT BOARD MAINTENANCE TECHNIQUES

1. If foil is intact but not covered with solder it is a good contact. Do not attempt to cover with solder.

2. Voltage measurements can be made from either side of the board. Use a needle-point probe to penetrate to the wiring whenever a protective coating is used on the wiring. A brass probe can be soldered to an alligator clip adapted to measuring instrument.

3. Always use a heat sink when soldering transistors; a transistor pad with mounting feet is an effective heat sink.

4. Broken or damaged printed wiring is usually the result of an imperfection, strain or careless soldering. To repair small breaks, tin a short piece of hook-up wire to bridge

the break, and holding the wire in place, flow solder along the length of wire so that it becomes part of the circuitry.

5. When unsoldering components from the board never pry or force loose the part; unsolder the component by using the wicking process described below:

   (a) Select a 3/16 inch tinned copper braid for use as a wick; if braid is not available, select AWG No. 14 or No. 16 stranded wire with 1/2 inch insulation removed.

   (b) Dip the wick in liquid rosin flux.

   (c) Place the wick onto the soldered connection and apply soldering iron onto the wick.

   (d) When sufficient amount of solder flows onto the wick, freeing the component, simultaneously remove iron and wick.

TROUBLE CHART

The trouble chart is intended as a guide for locating trouble causes, and is used along with the schematic diagram.

The operating conditions assumed for the trouble chart are as follows:

(a) AC power of proper voltage and frequency is present at input terminals.

(b) Either positive or negative terminal is connected to chassis ground.

(c) The power supply is connected for constant voltage with local sensing. See schematic; dotted lines indicate jumpers connected for local sensing operation.

TROUBLE CHART

Symptom	Probable Cause	Remedy
1. No output voltage	No power input, thermostat S1 open	Check power source, S1, line cord and line cord plug; shut off unit, allow to cool and check ambient temperature
	Improper output terminal connection	Refer to appropriate connection diagram, and check for correct connections
	Faulty Q2, CR1, CR6 (or Q3 for Zero Volt Units)	Check Q2, CR1, CR6 (or Q3) for short and replace as required
2. Unable to adjust output voltage	Damaged VOLTAGE ADJUST control	Check R1 for shorts and/or open; replace as required
	Supply operating as constant current source at current limit value	Remove load, check load value and check for shorts and/or improper supply-load connections; refer to appropriate diagram for correct connections
3. Output voltage too high	Improper output terminal connection	Refer to appropriate connection diagram, and check for correct connections

TROUBLE CHART (Cont'd)

Symptom	Probable Cause	Remedy
3. (Cont'd)	Faulty Q1, R1, Q8-Q13, (or Q10-Q13 as appl.) Q5, Q6 (and Q8, Q9 as appl.) or CR1	Check R1 for open; Q8-Q13, (or Q10-Q13) Q5, Q6, (and Q8, Q9), Q1 for short; CR1 for open and replace as required.
4. Output voltage too low	Load resistance improper for unit ratings	Check load resistance value
	Faulty Q2, Q3, R25, R17 (or CR4 where used)	Check Q2, Q3 (or CR4) for short, R25, R17 for open, replace as required
5. High ripple and unregulated DC output	Load resistance improper for unit ratings	Check load resistance value
6. This step only for units with current sink Q4. Current limit value improper and varies directly with output voltage	Faulty Q4	Check Q4 for short and replace as required
7. High ripple	Improper ground	Connect terminal 6 or terminal 4 to ground terminal 5

PREFORMANCE CHECK

Check the ripple and regulation of the power supply using the test connection diagram shown in figure 8. Use suggested test equipment or equivalent to obtain accurate results. Refer to SPECIFICATIONS AND FEATURES for minimum performance standards.

Set the differential meter, DC VTVM (John Fluke Model 825A or equivalent) to the selected power supply operating voltage. Check the power supply load regulation accuracy while switching from the full load to no-load condition. Long load leads should be a twisted pair to minimize AC pick-up.

Use a Variac to vary the line voltage from 105-132 or 132-105 volts AC and check the power supply line regulation accuracy on the VTVM differential meter.

Use a VTVM, Ballantine 320 or equivalent, to measure rms ripple voltage of the power supply DC output. Use oscilloscope to measure peak-to-peak ripple voltage of the power supply DC output.

ADJUSTMENT OF CALIBRATION CONTROL R17

Whenever Q3, R25* or R17*(and Q4, CR4 where used) are replaced, and voltage and current indications do not reflect maximum ratings, adjust R17 as follows:

*For model LM234, LMD-0-14, LMD-0-32, LMD-0-60, adjustment is required only when R17 or R25 is replaced. The adjustment procedure requires that the power supply is removed from associated equipment, is at ambient temperature of 25-30^{O}C, and is stabilized and not operating.

1. Remove AC power input to the supply.

2. Unsolder wiper of R17 from resistor housing and turn to full CW position.

3. Operate power supply for constant voltage with local sensing, connected as shown in figure 3, with no external load.

4.** Turn voltage adjust control until minimum rated output voltage is obtained.

5.** Apply load so that output current is 110% of 40°C rating for the unit.

6.** Using an oscilloscope, Tektronix 503 or equivalent, observe output voltage while adjusting R17 in a CCW direction. Adjust R17 until output ripple increases sharply and oscilloscope pattern changes.

7.** After adjustment is completed, remove AC power input to the supply and solder wiper of R17 to resistor housing.

8.** After soldering, check setting and repeat adjustment procedure if required.

** Perform alternate steps 4A through 9A for adjustment of R17 on models LM234, LMD-0-14, LMD-0-32 and LMD-0-60.

4A. Turn voltage adjust control until rated output voltage is obtained.

5A. Apply load so that output current is 130% of 40°C rating for the unit.

6A. Using an oscilloscope, Tektronix 503 or equivalent, observe unit output voltage while adjusting R17 in a CCW direction. Adjust R17 until output ripple increases sharply and oscilloscope pattern changes.

7A. Place a DC ammeter of appropriate scale across output terminals 4 and 6 of the supply. The meter indication shall be a maximum of 133% of 40°C rating for the unit.

8A. After adjustment is completed, remove AC power input to the supply and solder wiper of R17 to resistor housing.

9A. After soldering, check setting and repeat adjustment procedure if required.

SERVICE

When additional instructions are required or repair service is desired, contact the nearest Lambda office where trained personnel and complete facilities are ready to assist you.

Please include the power supply model and serial number together with complete details of the problem. On receipt of this information, Lambda will supply service data or advise shipping for factory repair service.

All repairs not covered by the warranty will be billed at cost and an estimate forwarded for approval before work is started.

PARTS ORDERING

Standard components and special components used in Lambda power supply can be obtained from the factory. In case of emergency, critical spare parts are available through any Lambda office.

The following information must be included when ordering parts:

1. Model number and serial number of power supply and purchase date.
2. Lambda part number.
3. Description of part together with circuit designation.
4. If part is not an electronic part, or is not listed, provide a description, function, and location of the part.

PARTS LIST

The electrical parts located on all LM-D models are listed here. Parts common to a group of LM-D models are listed first. Unique parts of individual models within the group are listed separately, by model, immediately following the group common-parts listing. In addition there are separate listings of parts for the metered panel (MP) option, the Y option and the overvoltage protection (OV) option, as applicable, for all LM-D models. The parts listed for model LM-234 do not utilize the common parts - unique parts listings; all the parts for this model are sequentially listed under the heading "PARTS FOR MODEL LM234". Parts for the "T" option, "R" option and "V" option are included at the ending of this listing.

MODELS LM-235 — LM-238

COMMON PARTS

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
C1	Cap., mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap., mylar, 100 mfd ±10%, 28 vdc	CGM-22-003
C4	Cap., elect., 3.0 mfd -10 + 75%, 100 vdc	CBN-30-015
C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C7*	Cap., elect., 140 mfd -10 + 100%, 38 vdc	CBR-14-030
C9	Cap. mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012
C11	Not assigned	
C12+	Cap., mylar, .001 mfd ±10%, 200 vdc	CGK-10-004
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3	Same as CR2	
CR4	Rectifier, zener diode	FBM-Z102
CR5	Same as CR2	
CR6	Rectifier, zener diode	FBM-Z103
CR7	Same as CR2	
F1	Fuse, 7 amperes, 3 AG, "SLO-BLO"	FFC-07-000
Q1	Transistor, NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q7	Not assigned	
R3	Res., ww, 1,200 ohms ±3%, 2 w	DFS-12-030
R4*	Res., film, 15,000 ohms ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2 w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R7	Res., film, 3,900 ohms ±5%, 1/2 w	DCS-39-014
R8	Res., comp., 4,700 ohms ±10%, 1/4w	DCB-4721
R9	Res., comp., 150 ohms ±10%, 1/4 w	DCB-1511
R10	Res., comp., 3,900 ohms ±10%, 1/2 w	DEB-3921
R11	Res., comp., 22,000 ohms ±10%, 1/2 w	DEB-2231
R12	Res., comp., 47 ohms ±10%, 1/2 w	DEB 4701
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005

MODELS LM-235 — LM-238 (Cont)

COMMON PARTS (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R14, R15	Not assigned	
R17	Res., var., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R18	Res., film, 2,000 ohms ±5%, 1/2 w	DCS-20-018
R22	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R23	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201
S1	Thermostat	FKA-142-015
XF1	Fuseholder	HRM-00-009

+This part not used on units with serial no. prefixes A,B
*This part not used on units with "Y" option

UNIQUE PARTS

MODEL LM-235

C3	Cap., elect., 3,200 mfd -10 +100%, 28 vdc	CBS-32-027
C6	Cap., mylar, 0.0068 mfd ±10%, 200 vdc	CGK-68-001
C8	Cap., elect., 15,700 mfd -10 + 100%, 20 vdc	CBT-16-010
C10	Cap., mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012
CR8	Rectifier	FBL-00-054
CR9	Not assigned	
CR10	Same as CR8	
Q4	Transistor, PNP	FBN-L103
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36486
Q8 thru Q13	Transistor, NPN	FBN-36485
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS-22-056
R2	Res., ww, 1,200 ohms ±3%, 2 w	DFS-12-030
R16	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R19	Res., film, 1,000 ohms ±5%, 1/2 w	DCS-10-019
R20	Res., comp., 15,000 ohms ±10%, 1/2 w	DEB-1531

UNIQUE PARTS (Cont)

MODEL LM-235 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R21	Res., film, 1,800 ohms ±5%, 1/2 w	DCS-18-013
R24	Res., comp., 1,500 ohms ±10%, 2 w	DHB-1521
R25 thru R30	Res., ww, 1.0 ohms ±3%, 3 w	DFN-10-041
T1	Transformer	ABA-235

MODEL LM-236

C3	Cap., elect., 600 mfd -10 + 100%, 75 vdc	CBR-60-022
C6	Cap., mylar, 0.0033 mfd ±10%, 200 vdc	CGK-33-003
C8	Cap., elect., 9000 mfd -10 + 100%, 45 vdc	CBS-90-021
C10	Cap., mylar, 0.1 mf ±10%, 200 vdc	CAM-10-012
CR8	Rectifier	FBL-00-054
CR9	Not assigned	
CR10	Same as CR8	
Q4	Transistor, PNP	FBN-L103
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-35469
Q8-Q13	Transistor, NPN	FBN-36220
R1	Res., var., ww, 4,500 ohms ±5%, 5 w	DNS-45-050
R2	Res., ww, 2,000 ohms ±3%, 3 w	DFS-20-032
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R19	Res., film, 2,700 ohms ±5%, 1/2 w	DCS-27-020
R20	Res., comp., 47,000 ohms ±10%, 1/2 w	DEB-4731
R21	Res., film, 2,400 ohms ±5%, 1/2 w	DCS-24-001
R24	Res., comp., 1,500 ohms ±10%, 2 w	DHB-1521
R25 thru R30	Res., ww, 1.5 ohms ±3%, 3 w	DFN-15-042
T1	Transformer	ABA-236

MODEL LM-237

C3	Cap., elect., 600 mfd -10 + 100%, 75 vdc	CBR-60-022
C6	Cap., mylar, 0.0068 mfd ±10%, 200 vdc	CGK-68-001
C8	Cap., elect., 8,400 mfd -10 + 100%, 60 vdc	CBS-84-036
C10	Not assigned	
CR8 thru CR11	Rectifier	FBL-00-054
Q4	Transistor, PNP	FBN-L103
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-36488
Q8 thru Q13	Transistor, NPN	FBN-36487
R1	Res., var., ww, 4,500 ohms ±5%, 5 w	DNS-45-050
R2	Res., ww, 3,000 ohms ±3%, 3 w	DFS-30-021
R16	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221

UNIQUE PARTS (Cont)

MODEL LM-237 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R19	Res., film, 6,800 ohms ±5%, 1/2 w	DCS-68-021
R20	Res., comp., 120,000 ohms ±10%, 1/2 w	DEB-1241
R21	Res., film, 4,700 ohms ±5%, 1/2 w	DCS-47-003
R24	Res., comp., 3,300 ohms ±10%, 2 w	DHB-3321
R25 thru R30	Res., ww, 1.5 ohms ±3%, 3 w	DFN-15-042
T1	Transformer	ABA-237

MODEL LM-238

C3	Cap., elect., 520 mfd -10 + 100%, 100 vdc	CBR-52-025
C6	Cap., mylar, 0.0033 mfd ±10%, 200 vdc	CGK-33-003
C8	Cap., elect., 3,100 mfd -10 + 100%, 110 vdc	CBS-31-024
CR8 thru CR11	Rectifier	FBL-00-054
Q4	Transistor, PNP	FBN-L107
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-35903
Q8 thru Q13	Transistor, NPN	FBN-35902
R1	Res., var., ww, 9,000 ohms ±5%, 5 w	DNS-90-058
R2	Res., ww, 4,500 ohms ±3%, 3 w	DFS-45-044
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R19	Res., film, 10,000 ohms ±5%, 1/2 w	DCT-10-008
R20	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R21	Same as R19	
R24	Same as R2	
R25 thru R30	Res., ww, 3.0 ohms ±3%, 3 w	DFN-30-023
T1	Transformer	ABA-238

MODELS LM-D3 — LM-D6

COMMON PARTS

C1	Cap., mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap., mylar, 0.22 mfd ±10%, 100 vdc	CGM-22-003
C3	Cap., elect., 3,600 mfd -10%, +100%, 20 vdc	CBS-36-044
C4	Cap., elect., 3.0 mfd -10% +75%, 100vdc	CBN-30-015
C6	Cap., mylar, 0.018 mfd ±10%, 200 vdc	CGL-18-005
C7*	Cap., elect., 140 mfd -10% + 100%, 38 vdc	CBR-14-030
C8	Cap., elect., 25,000 mfd -10% + 100%, 20 vdc	CBT-25-011
C9	Cap., mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012
C10	Same as C9	
C11	Not used	

MODELS LM-D3 – LM-D6 (Cont)

COMMON PARTS (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
C12	Cap., mylar, 00.001 mfd ±10%, 200 vdc	CGK-10-004
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3	Same as CR2	
CR4	Not used	
CR5	Not used	
CR6	Rectifier, zener diode	FBM-Z103
CR7	Same as CR2	
CR8	Rectifier	FBL-00-083
CR9	Same as CR8	
Q1	Transistor NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q4	Not used	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36486
Q7	Not used	
Q8	Transistor, NPN	FBN-36485
Q9 thru Q13	Same as Q8	
R3	Res., ww, 1,200 ohms ±3%, 2 w	DFS-12-030
R4*	Res., film, 15,000 ohms ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2w	DEB-1841
R7	Res., Film, 3,900 ohms ±5%, 1/2 w	DCS-39-014
R8	Res., comp., 4,700 ohms ±10%, 1/2 w	DCB-4721
R10	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221
R11	Res., comp., 22,000 ohms ±10%, 1/2 w	DEB-2231
R12	Res., comp., 47 ohms ±10%, 1/2 w	DEB-4701
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005
R14	Not used	
R15	Not used	
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R17	Res., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R19 thru R21	Not used	
R22	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R23	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201
S1	Thermostat	FKA-142-015

*This component not used on units with "Y" option

UNIQUE PARTS

MODEL LM-D3

C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
F1	Fuse, cartridge, 4 amps, 3AG, SLO-BLO	FFC-04-000
R1	Res., var., ww, 300 ohms ±5%, 5 w	DNR-30-161
R2	Res., ww, 430 ohms ±3% 3w	DFR-43-058
R9	Res., comp., 150 ohms ±10%, 1/2 w	DCB-1511
R18	Not used	

UNIQUE PARTS (Cont)

MODEL LM-D3 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R24	Res., comp., 330 ohms ±10%, 1 w	DGB3311
R25	Res., ww, 0.22 ohms ±5%, 5w	DFM-22-045
R26 thru R30	Same as R25	
T1	Transformer	ABA-D3

MODEL LM-D3P3

C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
F1	Fuse, cartridge, 4 amps 3AG, SLO-BLO	FFC04-000
R1	Res., var., ww, 600 ohms ±5%, 5w	DNR-60-028
R2	Res., ww, 430 ohms ±3%, 3w	DFR43-058
R9	Res., comp., 150 ohms ±10%, 1/2 w	DCB-1511
R18	Not used	
R24	Res., comp., 680 ±10%, 2 w	DHB6811
R25	Res., ww, 0.22 ohms ±5%, 5 w	DFM22-045
R26 thru R30	Same as R25	
T1	Transformer	ABA-D4

MODEL LM-D3P6

C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
F1	Fuse, cartridge, 4 amps 3AG, SLO-BLO	FFC04-000
R1	Res., var., ww, 600 ohms ±5%, 5 w	DNR-60-028
R2	Res., ww, 430 ohms ±3%, 3 w	DFR43-058
R9	Res., comp., 680 ohms ±10%, 2 w	DCB-1511
R18	Not used	
R24	Res., comp., 680 ohms ±15%, 2 w	DHB6811
R25	Res., ww, 0.22 ohms ±5%, 5 w	DFM22-045
R26 thru R30	Same as R25	
T1	Transformer	ABA-D4

MODEL LM-D4

C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
F1	Fuse, cartridge, 4 amps, 3AG, SLO-BLO	FFC04-000
R1	Res., ww, 600 ohms ±5%, 5 w	DNR-60-028
R2	Res., ww, 600 ohms ±3% 3 w	DFR-60-005
R9	Res., comp., 150 ohms ±10%, 1/2 w	DCB-1511
R18	Not used	
R24	Res., comp., 680 ohms ±10%, 2 w	DHB6811
R25	Res., ww, 0.22 ohms ±5%, 5 w	DFM22-045
R26 thru R30	Same as R25	
T1	Transformer	ABA-D4

MODEL LM-D4P5

C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002

UNIQUE PARTS (Cont)

MODEL LM-D4P5 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
F1	Fuse, cartridge, 5 amps 3AG, SLO-BLO	FFC05-000
R1	Res., var., ww, 600 ohms ±5%, 5 w	DNR-60-028
R2	Res., ww, 650 ohms ±3%, 3 w	DFR-65-062
R9	Res., comp., 47 ohms ±10%, 1/4w	DCB-4701
R18	Res., film, 390 ohms ±5%, 1/2 w	DCR39-004
R24	Res., comp., 680 ohms ±10%, 2 w	DHB6811
R25	Res., ww, 0.39 ohms ±5%, 5 w	DFM39-046
R26 thru R30	Same as R25	
T1	Transformer	ABA-D5

MODEL LM-D5

C5	Cap., mylar 0.018 mfd ±10%, 200 vdc	CGL-18-005
F1	Fuse, cartridge, 5 amps, 3AG, SLO-BLO	FFC05-000
R1	Res., var., ww, 600 ohms ±5%, 5 w	DNR60-028
R2	Res., ww, 650 ohms ±3%, 3 w	DFR-65-062
R18	Res., film, 1,300 ohms ±5%, 1/2 w	DCS13-010
R24	Res., comp., 680 ohms ±10%, 2 w	DHB6811
R25	Res., ww, 0.39 ohms ±5%, 5 w	DFM39-046
R26 thru R30	Same as R25	
T1	Transformer	ABA-D5
R9	Res., comp., 47 ohms ±10%, 1/4 w	DCB-4701

MODEL LM-D6

F1	Fuse, cartridge, 5 amps, 3AG, SLO-BLO	FFC05-000
R1	Res., ww, 600 ohms ±5%, 5 w	DNR60-028
R2	Res., ww, 800 ohms ±3%, 2 w	DFR80-037
R18	Res., film, 1,300 ohms ±5%, 1/2 w	DCS-13-010
R24	Res., comp., 680 ohms ±10%, 2 w	DHB6811
R25	Res., ww, 0.39 ohms ±5%, 5 w	DFM39-046
R26 thru R30	Same as R25	
T1	Transformer	ABA-D6

MODELS LM-D8 – LM-D60

COMMON PARTS

C1	Cap., mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap., mylar, 0.22 mfd ±10%, 100 vdc	CGM-22-003
C4	Cap., elect., 3.0 mfd -10 +75%, 100 vdc	CBN-30-015
C5+	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C7*	Cap., elect., 140 mfd -10% + 100%, 38 vdc	CBR-14-030
C9	Cap., mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012

MODELS LM-D8 – LM-D60 (Cont)

COMMON PARTS (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
C10	Not used	
C11	Not used	
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3	Same as CR2	
CR4	Not used	
CR5	Not used	
CR6	Rectifier, zener diode	FBM-Z103
CR7	Same as CR2	
Q1	Transistor, NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q4	Not used	
Q7	Not used	
R3	Res., ww, 1,200 ohms ±3%, 2 w	DFS-12-030
R4*	Res., film, 15,000 ohms ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2 w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R7	Res., film, 3,900 ohms ±5%, 1/2 w	DCS-39-014
R8	Res., comp., 4,700 ohms ±10%, 1/4 w	DCB-4721
R9	Res., comp., 150 ohms ±10%, 1/4 w	DCB-1511
R10	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221
R11	Res., comp., 22,000 ohms ±10%, 1/2 w	DEB-2231
R12	Res., comp., 47 ohms ±10%, 1/2 w	DEB-4701
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005
R14	Not used	
R15	Not used	
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R17	Res., var., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R19 thru R21	Not used	
R22	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R23	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201
S1	Thermostat	FKA-142-015

*This component not used on units with "Y" option
+This part differs on model LM-D60; see LM-D60 unique parts list

UNIQUE PARTS

MODEL LM-D8

C3	Cap., elect., 3,600 mid -10% +100%, 20 vdc	CBS-36-044
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL-18-005
C8	Cap., elect., 25,000 mfd, -10% +100%, 20 vdc	CBT25-011
C12	Cap., mylar 0.001 mfd, ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC-07-000
CR8	Rectifier	FBL-00-083
CR9 - CR11	Same as CR8	

UNIQUE PARTS (Cont)

MODEL LM-D8 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36486
Q8	Transistor, NPN	FBN-36485
Q9 - Q13	Same as Q8,	
R1	Res., var., ww, 1,000 ohms ±5%, 5 w	DNS10-027
R2	Res., ww, 1, 200 ohms ±3%, 2 w	DFS12-030
R18	Res., film, 2,400 ohms ±5%, 1/2 w	DCS-24-001
R24	Res., comp., 1,500 ohms ±10%, 2 w	DHB-1521
R25	Res., ww, 0.22 ohms ±5%, 5 w	DFM22-045
R26 thru R30	Same as R25	
T1	Transformer	ABA-D8

MODEL LM-D10

C3	Cap., elect., 2,100 mfd -10% +100%, 35 vdc	CBS21-043
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 14,000 mfd, -10% +100%, 35 vdc	CBT14-012
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC07-000
CR8	Rectifier	FBL-00-083
CR9- CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN 36486
Q8	Transistor, NPN	FBN 36485
Q9- Q13	Same as Q8	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS22-056
R2	Res., ww, 1,200 ohms ±3%, 2 w	DFS12-030
R18	Res., film, 2,400 ohms ±5%, 1/2 w	DCS24-001
R24	Res., comp., 1,500 ohms ±10%, 2 w	DHB1521
R25	Res., ww, 0.68 ohms ±5%, 5 w	DFM68-048
R26 thru R30	Same as R25	
T1	Transformer	ABA-D10

MODEL LM-D12

C3	Cap., elect., 2,100 mfd, -10% +100%, 35 vdc	CBS-21-043
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL-18-005
C8	Cap., elect., 14,000 mfd -10% +100%, 35 vdc	CBT-14-012
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC07-000
CR8	Rectifier	FBL-00-083
CR9- CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN36486

UNIQUE PARTS (Cont)

MODEL LM-D12 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
Q8	Transistor, NPN,	FBN-36485
Q9- Q13	Same as Q8,	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS22-056
R2	Res., ww, 1,800 ohms ±3% 3 w	DFS18-048
R18	Res., film, 2,400 ohms ±5%, 1/2 w	DCS24-001
R24	Res., comp., 1,500 ohms ±10%, 2 w	DHB-1521
R25	Res., ww, 0.68 ohms ±5%, 5 w	DFM68-048
R26 thru R30	Same as R25	
T1	Transformer	ABA-D12

MODEL LM-D15

C3	Cap., elect., 2,100 mfd, -10% +100%, 35 vdc	CBS21-043
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 14,000 mfd, -10% +100%, 35 vdc	CBT14-012
C12	Cap., mylar, 0.01 mfd ±20%, 80 vdc	CGL-10-008
F1	Fuse, cartridge, 7.0 amps 3 AG, SLO-BLO	FFC07-000
CR8	Rectifier	FBL-00-054
CR9- CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN 35469
Q8	Transistor, NPN.	FBN36220
Q9- Q13	Same as Q8,	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS22-056
R2	Res., ww, 1,800 ohms ±3%, 3 w	DFS-18-048
R18	Res., film, 2,400 ohms ±5%, 1/2 w	DCS24-001
R24	Res., comp., 2,200 ohms ±10%, 2 w	DHB-2221
R25	Res., ww, 0.68 ohms ±5%, 5 w	DFM-68-048
R26 thru R30	Same as R25	
T1	Transformer	ABA-D15

MODEL LM-D18

C3	Cap., elect., 2,100 mfd, -10% +100% 35 vdc	CBS21-043
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL-18-005
C8	Cap., elect., 14,000 mfd, -10% +100%, 35 vdc	CBT14-012
C12	Cap., mylar. 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC 07-000
CR8	Rectifier	FBL-00-054
CR9- CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN35469
Q8	Transistor, NPN,	FBN36220
Q9- Q13	Same as Q8,	

UNIQUE PARTS (Cont)

MODEL LM-D18 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS22-056
R2	Res., ww, 2,500 ohms ±3%, 3 w	DFS25-036
R18	Res., film, 6,800 ohms ±5%, 1/2 w	DCS68-021
R24	Res., comp., 2,200 ohms ±10%, 2 w	DHB2221
R25	Res., ww, 1.0 ohms ±3%, 5 w	DFN10-014
R26 thru R30	Same as R25	
T1	Transformer	ABA-D18

MODEL LM-D20

C3	Cap., elect., 1,100 mfd, -10% +100% 60 vdc	CBS11-042
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 7,800 mfd, -10% +100%, 60 vdc	CBS78-045
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC07-000
CR8	Rectifier	FBL-00-054
CR9-CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN36488
Q8	Transistor, NPN,	FBN 36487
Q9-Q13	Same as Q8,	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS-22-056
R2	Res., ww, 2,500 ohms ±3%, 3 w	DFS25-036
R18	Res., film, 6,800 ohms ±5%, 1/2 w	DCS68-021
R24	Res., comp., 3,300 ohms ±10%, 2 w	DHB3321
R25	Res., ww, 1.0 ohms ±3%, 5 w	DFN10-014
R26 thru R30	Same as R25	
T1	Transformer	ABA-D20

MODEL LM-D24

C3	Cap., elect., 1,100 mfd, -10% +100%, 60 vdc	CBS11-042
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 7,800 mfd, -10% + 100% 60 vdc	CBS 78-045
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC 07-000
CR8	Rectifier	FBL-00-054
CR9-CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN 36488
Q8	Transistor, NPN,	FBN 36487
Q9-Q13	Same as Q8,	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS22-056

UNIQUE PARTS (Cont)

MODEL LM-D24 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R2	Res., ww, 3,600 ohms ±3%, 3 w	DFS 36-050
R18	Res., film, 6,800 ohms ±5%, 1/2 w	DCS68-021
R24	Res., comp., 3,300 ohms ±10%, 2 w	DHB3321
R25	Res., ww, 1.25 ohms ±3%, 3 w	DFN13-051
R26 thru R30	Same as R25	
T1	Transformer	ABA-D24

MODEL LM-D28

C3	Cap., elect., 1,100 mfd, -10% +100% 60 vdc	CBS11-042
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 7,800 mfd, -10% +100% 60 vdc	CBS78-045
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 7.0 amps, 3 AG, SLO-BLO	FFC07-000
CR8	Rectifier	FBL-00-054
CR9-CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN36488
Q8	Transistor, NPN,	FBN36487
Q9-Q13	Same as Q8,	
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS-22-056
R2	Res., ww, 4,500 ohms ±3%, 3 w	DFS45-044
R18	Res., film, 6,800 ohms ±5%, 1/2 w	DCS68-021
R24	Res., comp., 3,300 ohms ±10%, 2 w	DHB3321
R25	Res., ww, 1.25 ohms ±3%, 3 w	DFN13-051
R26 thru R30	Same as R25	
T1	Transformer	ABA-D28

MODEL LM-D36

C3	Cap., elect., 1,100 mfd, -10% +100% 60 vdc	CBS11-042
C6	Cap., mylar, 0.018 mfd, ±10%, 200 vdc	CGL18-005
C8	Cap., elect., 7,800 mfd, -10% +100% 60 vdc	CBS78-045
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 8.0 amps, 3AB, NORM-BLO	FFJ-08-000
CR8	Rectifier	FBL00-054
CR9-CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN36488
Q8	Transistor, NPN,	FBN 36487
Q9-Q13	Same as Q8,	
R1	Res., var., ww, 3,300 ohms ±5%, 5 w	DNS33-057
R2	Res., ww, 5,600 ohms ±3%, 3 w	DFS56-053
R18	Res., film, 10,00 ohms ±5%, 1/2 w	DCT10-008

UNIQUE PARTS (Cont)

MODEL LM-D36 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R24	Res., comp., 3,300 ohms ±10%, 2 w	DHB-3321
R25	Res., ww, 1.25 ohms ±3%, 3 w	DFN-13-051
R26 thru R30	Same as R25	
T1	Transformer	ABA-D36

MODEL LM-D48

C3	Cap., elect., 1000 mfd, -10% +100% 75 vdc	CBS-10-092
C6	Cap., mylar, 0.01 mfd, ±10%, 200 vdc	CGL-10-002
C8	Cap., elect., 3,000 mfd, -10% +100% 100 vdc.	CBS-30-047
C12	Cap., mylar. 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 8.0 amps, 3 AB, NORM-BLO	FFJ-08-000
CR8	Rectifier	FBL-00-054
CR9-CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-35903
Q8	Transistor, NPN	FBN-36487
Q9-Q13	Same as Q8	
R1	Res., var., ww, 3,300 ohms ±5%, 5 w	DNS33-057
R2	Res., ww, 8,000 ohms ±3%, 3 w	DFS-80-054
R18	Res., film, 10,000 ohms ±5%, 1/2 w	DCT-10-008
R24	Res., comp., 4,700 ohms ±10%, 2 w	DHB-4721
R25	Res., ww, 1.5 ohms ±3%, 3 w	DFN-15-042
R26 thru R30	Same as R25	
T1	Transformer	ABA-D48

MODEL LM-D60

C3	Cap., elect., 400 mfd -10 +100%, 100 vdc	CBR-40-044
C5	Cap., mylar, 0.018 mfd ±10%, 200 vdc	CGL-18-005
C6	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C8	Cap., elect., 3,000 mfd -10 +100%, 100 vdc	CBS-30-047
C12	Cap., mylar, 0.001 mfd ±10%, 200 vdc	CGK-10-004
F1	Fuse, cartridge, 8.0 amps, 3 AB, NORM-BLO	FFJ-08-000
CR8	Rectifier	FBL-00-054
CR9 thru CR11	Same as CR8	
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-35903
Q8	Transistor, NPN,	FBN-35902
Q9 thru Q13	Same as Q8,	
R1	Res., var., ww, 4,500 ohms ±5%, 5 w	DNS-45-050
R2	Res., ww, 10,000 ohms ±3%, 5 w	DFT-10-042
R18	Res., film, 15,000 ohms ±5%, 1/2 w	DCT-15-013

UNIQUE PARTS (Cont)

MODEL LM-D60 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R24	Res., comp., 5,600 ohms ±10%, 2 w	DHB-5621
R25	Res., ww, 1.5 ohms ±3%, 3 w	DFN-15-042
R26 thru R30	Same as R25	
T1	Transformer	ABA-D60

COMMON PARTS

MODELS LM-D100 — LM-D150

C1	Cap., mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap., mylar, 0.15 mfd ±10%, 200 vdc	CGM-15-005
C3	Cap., elect., 200 mfd -10% + 100%, 250 vdc	CBR-20-045
C4	Cap., elect., 3.5 mfd -10 + 100%, 300 vdc	CBN-35-018
C5, C6	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C6A	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C7*	Cap., elect., 140 mfd -10 + 100%, 38 vdc	CBR-14-030
C8	Cap., elect., 1,200 mfd -10 +100%, 250 vdc	CBS-12-048
C9, C10	Not assigned	
C11	Cap., mylar, 0.033 mfd +10%, 400 vdc	CGL-33-006
C13, C14	Cap., mylar, 0.018 mfd ±10%, 200 vdc	CGL-18-005
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3	Same as CR2	
CR4, CR5	Not assigned	
CR6	Rectifier, zener diode	FBM-Z103
CR7	Same as CR2	
F1	Fuse, 8.0 amperes 3 AB, NORM-BLO	FFJ-08-000
Q1	Transistor, NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q4	Not assigned	
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-35903
Q7	Not assigned	
Q8	Same as Q5	
Q9	Same as Q6	
Q10	Transistor, NPN	FBN-35902
Q11 thru Q13	Same as Q10,	
R1	Res., var., ww, 9,000 ohms ±5%, 5 w	DNS-90-058
R3	Res., ww, 1,200 ohms ±3%, 2w	DFS-12-030
R4*	Res., film, 15,000 ohms ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2 w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R7	Res., film, 3,900 ohms ±5%, 1/2	DCS-39-014
R7A	Res., comp., 3,900 ohms ±10%, 1/4 w	DCB-3921
R8	Res., comp., 4,700 ohms ±10%, 1/4w	DCB-4721

COMMON PARTS (Cont)

MODELS LM-D100 — LM-D150 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R9	Res., comp., 150 ohms ±10%, 1/4 w	DCB-1511
R10	Res., comp., 3,900 ohms ±10%, 1/2 w	DEB-3921
R11	Res., comp., 22,000 ohms ±10%, 1/2 w	DEB-2231
R12	Res., comp., 47 ohms ±10% 1/2 w	DEB-4701
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005
R14, R15	Not assigned	
R16	Res., comp., 1,200 ohms ±10%, 1/4 w	DEB-1221
R17	Res., var., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R19 thru R21	Not assigned	
R22	Res., comp., 150 ohms ±10%, 1/2 w	DEB-1511
R23	Res., comp., 33 ohms ±10%, 1/2 w	DEB-3301
R25, R26	Res., ww, 1.5 ohms ±3%, 3w	DFN-15-042
R27	Not assigned	
R28	Res., comp., 68 ohms ±10%, 1/2 w	DEB-6801
R29	Same as R28	
R30 thru R35	Not assigned	
R38 thru R46	Not assigned	
R47	Same as R22	
S1	Thermostat	FKA-142-015
XF1	Fuseholder	HRM-00-009

*This component not used on units with "Y" option

UNIQUE PARTS

MODEL LM-D100

C12	Cap., mylar, 0.01 mfd +20%, 80 vdc	CGL-10-008
CR8	Rectifier	FBL-00-065
CR9 thru CR11	Same as CR8	
R2	Res., ww, 16,000 ohms ±3%, 5 w	DFT-16-039
R18	Res., film, 39,000 ohms ±5%, 1/2 w	DCT-39-015
R24	Res., comp., 27,000 ohms ±10%, 2 w	DHB-2731
R36	Res., film, 24,000 ohms ±2%, 2 w	DCT-24-018
R37	Same as R36	
T1	Transformer	ABA-D100

MODEL LM-D120

C12	Cap., mylar, 0.001 mfd +10%, 200 vdc	CGK-10-004
CR8	Rectifier	FBL-00-065
CR9 thru CR11	Same as CR8	
R2	Res., ww, 20,000 ohms ±3%, 5 w	DFT-20-040

UNIQUE PARTS (Cont)

MODEL LM-D120 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R18	Res., film, 43,000 ohms ±5%, 1/2 w	DCT-43-016
R24	Res., comp., 27,000 ohms ±10%, 2 w	DHB-2731
R36	Res., film, 24,000 ohms ±2%, 2 w	DCT-24-018
R37	Same as R36	
T1	Transformer	ABA-D120

MODEL LM-D150

C12	Cap., mylar, 0.001 mfd +10%, 200 vdc	CGK-10-004
CR8	Rectifier	FBL-00-066
CR9 thru CR11	Same as CR8	
R2	Res. ww, 26,000 ohms ±3%, 5 w	DFT-26-041
R18	Res. film, 56,000 ohms ±5%, 1 w	DCT-56-017
R24	Res. comp., 47,000 ohms ±10%, 2 w	DHB-4731
R36	Res., film, 33,000 ohms ±2%, 2 w	DCT-33-019
R37	Same as R36	
T1	Transformer	ABA-D150

MODELS LMD-0-14 — LMD-0-60

COMMON PARTS

C1	Cap., mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap., mylar, 0.22 mfd ±10%, 100 vdc	CGM-22-003
C4	Cap., elect., 3.0 mfd -10 + 75%, 100 vdc	CBN-30-015
C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C6	Cap., mylar, 0.018 mfd ±10%, 200 vdc	CGL-18-005
C7*	Cap., elect., 140 mfd -10 + 100%, 38 vdc	CBR-14-030
C9	Cap., mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3 thru CR5	Not assigned	
CR6	Rectifier	FBM-Z103
CR7	Same as CR2	
CR13, CR14	Not assigned	
CR16, CR17	Not assigned	
CR18, CR19	Same as CR2	
F1	Fuse, "Slo-Blo", 4 amperes, 3AG	FFC-04-000
Q1	Transistor, NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q4	Not assigned	
Q7	Not assigned	
Q14 thru Q27	Not assigned	
R2	Not assigned	
R3	Res., ww, 1,100 ohms ±3%, 2 w	DFS-11-061

COMMON PARTS (Cont)

MODELS LMD-0-14 — LMD-0-60 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R4*	Res., film, 15,000 ohms ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2 w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R7	Res., film, 3,900 ohms ±5%, 1/2 w	DCS-39-014
R8	Res., comp., 4,700 ohms ±10%, 1/4w	DCB-4721
R9	Res., comp., 150 ohms ±10%, 1/4 w	DCB-1511
R10	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221
R11, R12	Not assigned	
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005
R14, R15	Not assigned	
R17	Res., var., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R18 thru R21	Not assigned	
R22	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R23	Res., comp., 22 ohms ±10%, 1/2 w	DEB-2201
R24	Not assigned	
R31 thru R42	Not assigned	
R43	Res., comp., 1,000 ohms ±10%, 1/2 w	DEB-1021
R46	Res., comp., 47 ohms ±5%, 1/2 w	DEB-4705
S1	Thermostat	FKA-142-015
XF1	Fuseholder	HRM-00-009

*This component not used on units with "Y" option

UNIQUE PARTS

MODEL LMD-0-14

C3	Cap., elect., 2,100 mfd -10 + 100%, 35 vdc	CBS-21-043
C8	Cap., elect., 9,000 mfd -10 + 100%, 45 vdc	CBS-90-021
C12	Cap., mylar, .001 mfd ±10%, 200 vdc	CGK-10-004
CR8	Rectifier	FBL-00-054
CR9 thru CR11	Same as CR8	
CR12	Rectifier	FBL-00-083
CR15	Not assigned	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36486
Q8	Transistor, NPN	FBN-36485
Q9 thru Q13	Same as Q8	
Q28	Same as Q5	FBN-L148
R1	Res., var., ww, 3,300 ohms ±5%, 5 w	DNS-33-057

UNIQUE PARTS (Cont)

MODEL LMD-0-14 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R16	Res., comp., 470 ohms ±10%, 1/2 w	DEB-4711
R25	Res., ww, 1.25 ohms ±3%, 3 w	DFN-13-051
R26 thru R30	Same as R25	
R44	Res., comp., 2,200 ohms ±10%, 1/2 w	DEB-2221
R45	Res., film, 820 ohms ±5%, 1 w	DCR-82-018
T1	Transformer	ABA-D-014

MODEL LMD-0-32

C3	Cap., elect., 1,100 mfd -10 + 100%, 60 vdc	CBS-11-042
C8	Cap., elect., 3,600 mfd -10 + 100%, 75 vdc	CBS-36-020
C12	Not assigned	
CR8	Rectifier	FBL-00-054
CR9 thru CR11	Same as CR8	
CR12	Rectifier	FBL-00-083
CR15	Not assigned	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36488
Q8	Transistor, NPN	FBN-36487
Q9 thru Q13	Same as Q8	
Q28	Same as Q5	FBN-L148
R1	Res., var., ww, 9,000 ohms ±5%, 5 w	DNS-90-058
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R25	Res., ww, 3.0 ohms ±3%, 3 w	DFN-30-023
R26 thru R30	Same as R25	
R44	Res., comp., 4,700 ohms ±10%, 2 w	DHB-4721
R45	Res., ww, 2,000 ohms ±3%, 3 w	DFS-20-032
T1	Transformer	ABA-D-032

MODEL LMD-0-60

C3	Cap., elect., 400 mfd -10 + 100%, 100 vdc	CBR-40-044
C8	Cap., elect., 3,100 mfd -10 + 100%, 110 vdc	CBS-31-024
C12	Not assigned	
CR8	Rectifier	FBL-00-054
CR9 thru CR11	Same as CR8	
CR12	Not assigned	
CR15	Rectifier	FBL-00-065
Q5	Transistor, NPN	FBN-L108
Q6	Transistor, NPN	FBN-35903
Q8	Transistor, NPN	FBN-35902

UNIQUE PARTS (Cont)

MODEL LMD-0-60 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
Q9 thru Q13	Same as Q8	
Q28	Same as Q5	
R1	Res., var., ww, 13,000 ohms ±5%, 5 w	DNT-13-032
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R25	Res., ww, 6.0 ohms ±3%, 3 w	DFN-60-054
R26 thru R30	Same as R25	
R44	Res., ww, 4,500 ohms ±3%, 3 w	DFS-45-044
R45	Same as R44	
T1	Transformer	ABA-D-060

PARTS FOR MODEL LM-234

C1	Cap, mylar, 0.033 mfd ±10%, 400 vdc	CGL-33-006
C2	Cap, mylar, 0.22 mfd ±10%, 100 vdc	CGM-22-003
C3	Cap, elect., 3,200 mfd -10% + 100%, 28 vdc	CBS-32-027
C4	Cap., elect., 3.0 mfd -10% + 75%, 100 vdc	CBN-30-015
C5	Cap., mylar, 0.01 mfd ±10%, 200 vdc	CGL-10-002
C6	Cap., mylar, 0.0033 mfd ±10%, 200 vdc	CGK-33-003
C7*	Cap., elect., 140 mfd -10% + 100%, 38 vdc	CBR-14-030
C8	Cap., elect., 15,700 mfd -10% + 100%, 28 vdc	CBT-16-010
C9	Cap., mylar, 0.1 mfd ±10%, 200 vdc	CAM-10-012
C10	Same as C9	
C11	Not assigned	
C12+	Cap., mylar, 0.001 mfd ±5%, 200 vdc	CGK-10-004
CR1*	Rectifier, zener diode	FBM-Z104
CR2	Rectifier	FBL-00-030
CR3	Not assigned	
CR4	Not assigned	
CR5	Not assigned	
CR6	Rectifier, zener diode	FBM-Z103
CR7	Same as CR2	
CR8	Rectifier	FBL-00-054
CR9	Not assigned	
CR10	Same as CR8	
CR11	Not assigned	
CR12	Same as CR8	
F1	Fuse, 4 amperes, SLO-BLO, 3 AG	FFC-04-000
Q1	Transistor, NPN	FBN-L110
Q2	Same as Q1	
Q3	Same as Q1	
Q4	Not assigned	
Q5	Transistor, NPN	FBN-L109
Q6	Transistor, NPN	FBN-36486
Q7	Not assigned	
Q8 thru Q13	Transistor, NPN	FBN-36485
R1	Res., var., ww, 2,200 ohms ±5%, 5 w	DNS-22-056
R2	Not assigned	

PARTS FOR MODEL LM-234 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R3	Res., ww, 1,100 ohms ±3%, 2w	DFS-11-061
R4*	Res., film, 15,000 ohms, ±2%, 1/2 w	DCT-15-013
R5	Res., film, 220 ohms ±2%, 1/2 w	DCR-22-005
R6	Res., comp., 180,000 ohms ±10%, 1/2 w	DEB-1841
R7	Res., film, 3,900 ohms ±5%, 1/2 w	DCS-39-014
R8	Res., comp., 4,700 ohms ±10%, 1/4w	DCB-4721
R9	Res., comp., 150 ohms ±10%, 1/4 w	DCB-1511
R10	Res., comp., 3,900 ohms ±10%, 1/2 w	DEB-3921
R11	Not assigned	
R12	Not assigned	
R13*	Res., ww, 600 ohms ±3%, 3 w	DFR-60-005
R14	Not assigned	
R15	Not assigned	
R16	Res., comp., 1,800 ohms ±10%, 1/2 w	DEB-1821
R17	Res., var., ww, 1,200 ohms ±10%, 1-1/2 w	DNS-12-026
R18	Not assigned	
R19++	Res., comp., 1,800 ohms ±10%, 1 w	DGB-1821
R20	Res., ww, 100 ohms ±3%, 10 w	DFR-10-056
R21	Not assigned	
R22	Res., comp., 1,200 ohms ±10%, 1/2 w	DEB-1221
R23	Res., comp., 100 ohms ±10%, 1/2 w	DEB-1011
R24	Not assigned	
R25 thru R30	Res., ww, 1.0 ohm ±3%, 3 w	DFN-10-041
S1	Thermostat	FKA-142-015
T1	Transformer	ABA-234

*This part not used on units with "Y" option
+This part not used on units with serial no. prefixes A and B.
++This part only used on units with serial no. prefixes A-C

PARTS FOR "MP" OPTION

MODELS MP-5, P-5

DS1	Pilot light assembly (ALL)	HRD 00-007
F1	Fuse, 3AG, "SLO-BLO", 8 amperes (LM-D36 thru LM-D150)	FFC-08-000
F1	Fuse, 3AG, "SLO-BLO", 4 amperes (LM-234, LM-D3 thru LM-D4)	FFC 04-000
F1	Fuse, 3AG, "SLO-BLO", 5 amperes (LM-D4P5, D5, D6)	FFC 05-000
F1	Fuse, 3AG, "SLO-BLO", 7 amperes (LM235, thru LM238, LM-D8 thru LM-D28)	FFC 07-000
F1	Fuse, 3AG, "SLO-BLO", 3 amperes (LM-DO-14 thru DO-60)	FFC-03-000
XF1	Fuseholder (ALL)	HRK-00-007

PARTS FOR "MP" OPTION (Cont)

MODELS MP-5, P-5 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
M1*	Meter, volts, D.C., 0-5 vdc (LM-D3 thru LM-D4P5)	EBN 50-003
M1*	Meter, volts, D.C., 0-8 vdc (LM-D5, LM-D6)	EBN 80-005
M1*	Meter, volts, D.C., 0-10 vdc (LM234, LM-D8)	EBP 10-016
M1*	Meter, volts, D.C., 0-15 vdc (LM235, LMD-0-14 LM-D12)	EBP 15-017
M1*	Meter, volts, D.C., 0-20 vdc (LM-D15, LM-D18)	EBP 20-014
M1*	Meter, volts, D.C., 0-25 vdc (LM236, LM-D20)	EBP 25-018
M1*	Meter, volts, D.C., 0-40 vdc (LM237, LM-D24, D28, D36, LMD-0-32)	EBP 40-013
M1*	Meter, volts, D.C., 0-60 vdc (LM238, LMD48, LMD-0-60)	EBP 60-015
M1*	Meter, volts, D.C., 0-8 vdc (LM-D60)	EBP-80-019
M1*	Meter, volts, D.C. 0-120 vdc (LM-D100)	EBR-12-075
M1*	Meter, volts, D.C., 0-150 vdc (LM-D120)	EBR-15-076
M1*	Meter, volts, D.C., 0-200 vdc (LM-D150)	EBR-20-077
M2*	Meter, amperes, D.C., 0-3 amperes (LM238, LM-D60, LMD-0-32)	EDN 30- 019
M2*	Meter, amperes, D.C., 0-5 amperes (LM237, LM-D48, LMD-0-14)	EDN 50-021
M2*	Meter, amperes, D.C., 0-10 amperes (LM234, LM235, LM236, LM-D12 thru LM-D24)	EDP 10-013
M2*	Meter, amperes, D.C., 0-15 amperes (LM-D3 thru LM-D10)	EDP 15-014
M2*	Meter, amperes, D.C., 0-6 amperes (LM-D28, D36)	EDN-60-018
M2*	Meter, amperes, D.C., 0-2 amperes (LM-D100)	EDN-20-022
M2*	Meter, amperes, D.C., 0-1.5 amperes (LM-D120, D150, LMD-0-60)	EDN-15-020
R1	Res., var., ww, 2,200 ohms ±5%, 5w (LM234, LM235, LM-D10 thru LM-D28)	DNS-22-053
R1	Res., var., ww, 4,500 ohms ±5%, 5w (LM236, LM237, LM-D60)	DNS-45-059
R1	Res., var., ww, 9,000 ohms ±5%, 5w (LM238, LM-D100 thru 150, LMD-0-32)	DNS-90-051
R1	Res., var., ww, 300 ohms ±5%, 5w (LM-D3)	DNR 30-018
R1	Res., var., ww, 600 ohms, ± 5%, 5w (LM-D3P3 thru LM-D6)	DNR-60-026
R1	Res., var., ww, 1,000 ohms ±5%, 5w (LM-D8)	DNS 10-032
R1	Res., var., ww, 3,300 ohms 5%, 5w (LM-D36, D48, D-0-14)	DNS-33-054

PARTS FOR "MP" OPTION (Cont)

MODELS MP-5, P-5 (Cont)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
R1	Res., var., ww, 13,000 ohms ±5%, 5w (LMD-0-60)	DNT-13-031
S1	Switch, SPST (ALL)	FDA11-017
C1	Cap., Tant. 2.5 mfd -15 + 75%, 100 vdc (ALL)	CBN-25-010
C2	Same as C1	

* This part only used on MP-5

PARTS FOR "OV" OPTION

COMMON PARTS

MODELS LMOV -1, -2, -3

C1	Cap., mylar, 0.01 mfd ±20%, 80 vdc	CGL-10-008
Q1	Transistor, NPN	FBN-L102
R3	Res., film, 200 ohms ±5%, 1/2w	DCR-20-010
R4	Res., thermistor, 425 ohms ±5%, 1-1/4 w	DKR-43-004
R5	Res., comp., 1,200 ohms ±10%, 1/2w	DEB-1221
R6	Same as R5	
R8	Res., comp., 15,000 ohms ±10%, 1/2w	DEB-1531
R10	Same as R5	
SCR1	Rectifier, silicon, controlled	FBP-00-009

UNIQUE PARTS

MODEL LMOV-1

Q2	Transistor, PNP	FBN-L103
R1	Res., var., ww or cermet, 2,000 ohms ±10%, 3/4w	DNS-20-034
R2	Res., film, 560 ohms ±2%, 1/2w	DCR-56-002
R7	Res., comp., 33 ohms ±5%, 1/4w	DCB-3305
R9	Not assigned	

MODEL LMOV-2

Q2	Transistor, PNP	FBN-L103
R1	Res., var., ww or cermet, 5,000 ohms ±10%, 3/4w	DNS-50-036
R2	Res., film, 1,470 ohms ±1%, 1/2w	DCS-15-031
R7	Res., comp., 33 ohms ±5%, 1/4w	DCB-3305
R9	Not assigned	

MODEL LMOV-3

Q2	Transistor, PNP	FBN-L114
R1	Res., var., ww or cermet, 20,000 ±10%, 3/4w	DNT-20-010
R2	Res., film, 4,700 ohms ±2%, 1/2w	DCS-47-028
R7	Res., comp., 39 ohms ±5%, 1/4w	DCB-3905
R9	Res., comp., 22 ohms ±10%, 1/2w	DEB-2201

PARTS FOR "Y" OPTION

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
C107	Cap., elec., 40 mfd 35 vdc	CBP-40-014
CR1	Rectifier, zener diode	FBM-Z107
CR101	Rectifier, zener diode	FBM-Z104
Q101	Transistor NPN	FBN-L109
R4	Res., comp., 220,000 ohms ±10% 1/2w	DEB-2241
R101	Res., film, 6,800 ohms ±2%, 1/4w	DCS-68-032
R102	Res., film 220 ohms ±2%, 1/4w	DCR-22-014

PARTS FOR "T" OPTION

For all "D" package models except F1 changes on LMD-0-14, 0-32, 0-60: LM234 thru LM238; LM-D3 thru LM-D4

The following parts change and a resistor is added in series to DS-1 of "MP" option:

C1	Cap., mylar, 0.033 mfd ±10%, 600 vdc	CGL-33-014
F1	Fuse, "SLO-BLO", 4.0 amps, 250 v	FFG-04-000
T1	Transformer	Add suffix "T" to reg. T1 no.
DS1-Res	Res., comp., 120K ±10% 1/2 w	DEB-1241

On following models F1 has different value

MODELS LMD-032, 0-60

F1	Fuse, "SLO-BLO", 1.5 amps, 250 v	FFG-01-500

PARTS FOR "T" OPTION (Cont.)

CIRC. DESIG.	DESCRIPTION	LAMBDA NO.
	MODELS LMD-0-14, LM-234	
F1	Fuse, "SLO-BLO", 2.0 amps, 250 v	FFG-02-000
	MODELS LM-235 thru LM 238; LM-D4P5 thru LM-D8	
F1	Fuse, "SLO-BLO", 3.0 amps, 250 v	FFG-03-000
	MODELS LM-D3 thru LM-D4	
F1	Fuse, "SLO-BLO", 2.5 amps, 250 v	FFG-02-500

PARTS FOR "R" OPTION

Transformer T1 changes on all "D" package models with suffix "R". For transformer T1 used on these models see standard "D" model parts lists for the standard transformer part no. and add suffix "R" to the part no.

PARTS FOR "V" OPTION

All "D" Package Models with the "V" option have the same part changes as listed for the "T" option except for capacitor C1 and transformer T1 listed below.

C1	Cap., paper, 0.01 mf ±10%, 1000 vdc	CAL-10-021
T1	Transformer	Add suffix "G*" to reg. T1 no.

* Suffix "V" for serial no. prefixes A-E

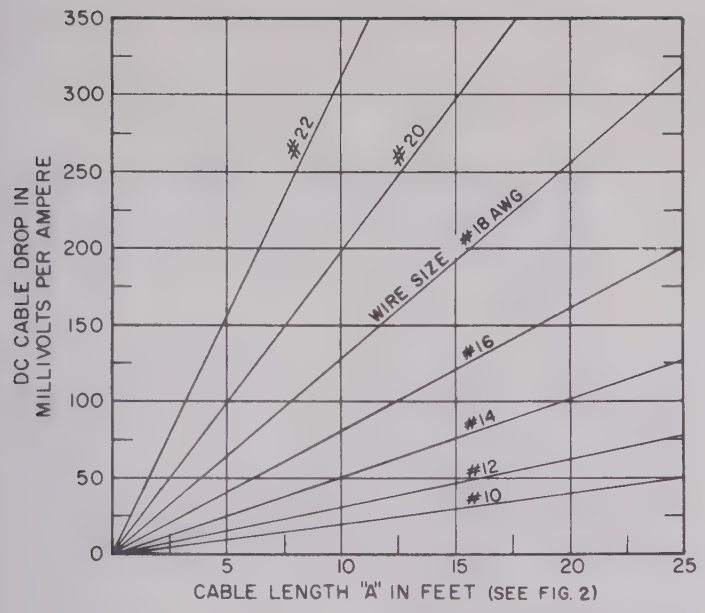


Figure 1. Cable Connection Chart

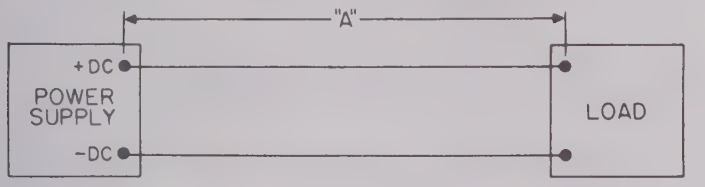
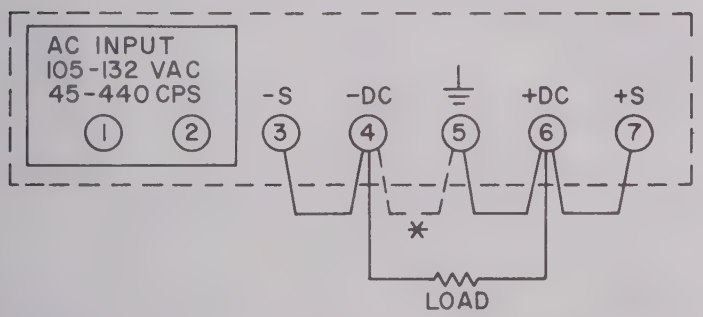
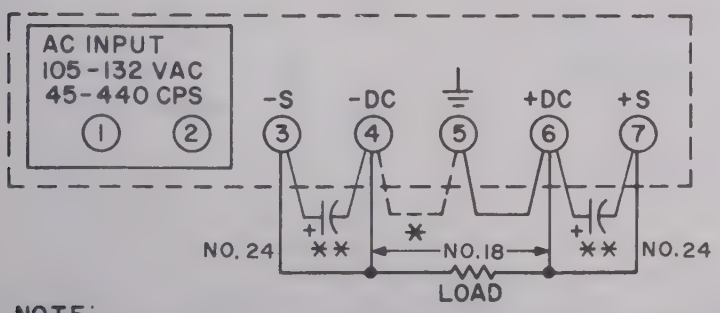


Figure 2. Cable Length "A" in Feet



NOTE:
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.

Figure 3. Local Sensing Connections



NOTE:
* FOR NEGATIVE GROUND, DISCONNECT JUMPER FROM TERMINALS 5 AND 6 AND RECONNECT TO TERMINALS 4 AND 5.
** A 2.5MF, ELECT., CAP. MAY BE REQUIRED.

Figure 4. Remote Sensing Connections

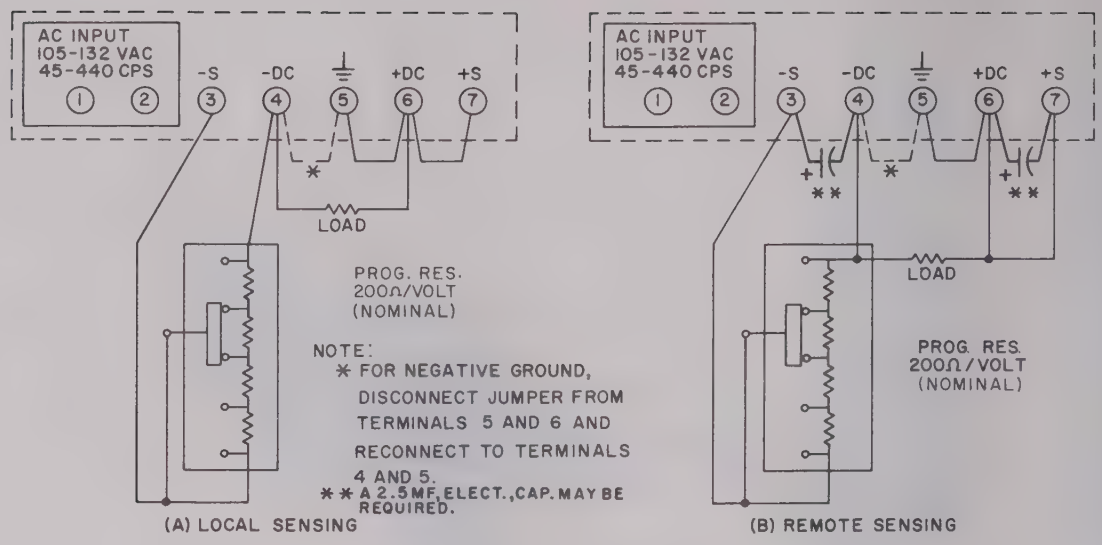


Figure 5. Programmed Voltage, with External Resistor

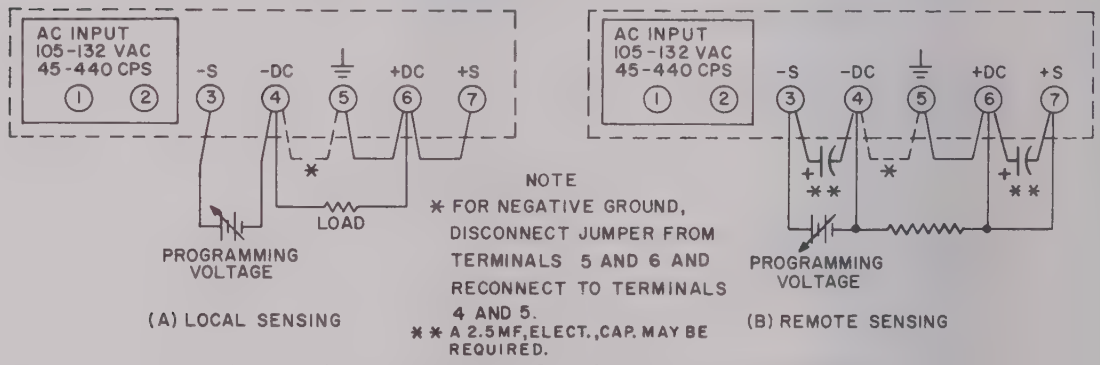


Figure 6. Programmed Voltage, with External Programming Voltage Source

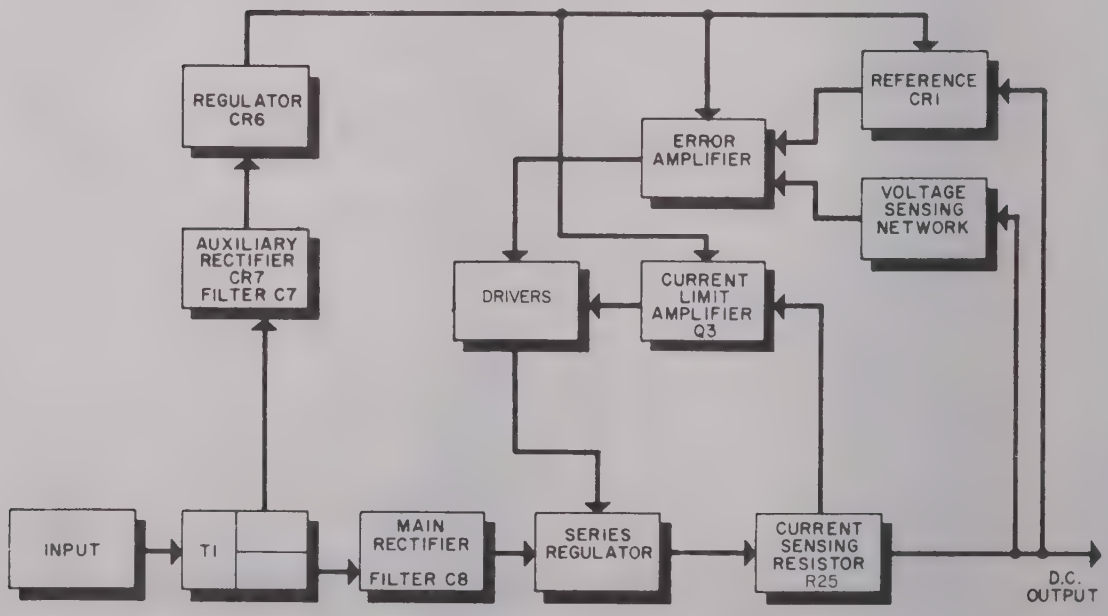


Figure 7. Typical Block Diagram

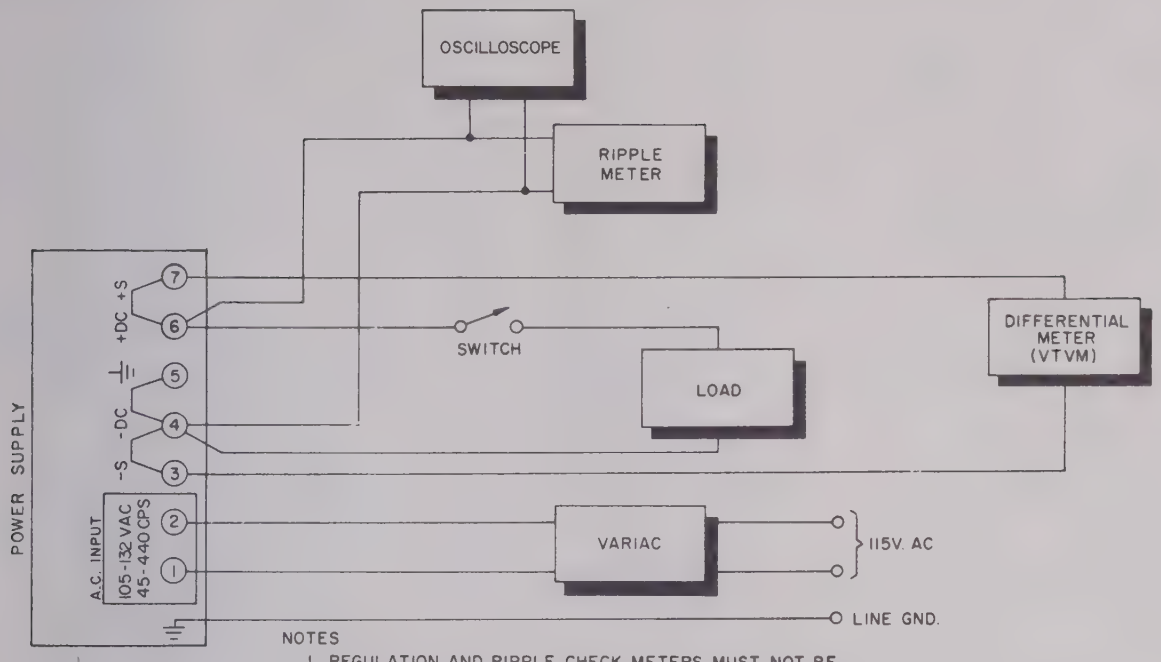


Figure 8. Test Connections for Performance Checks

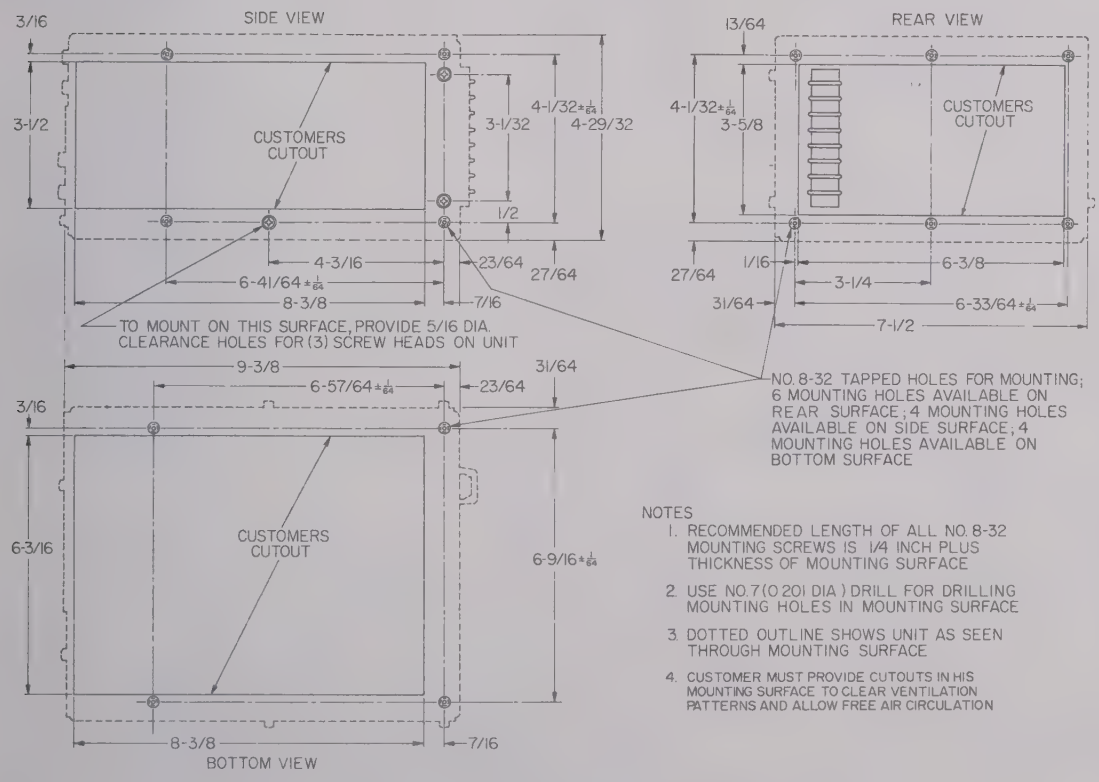
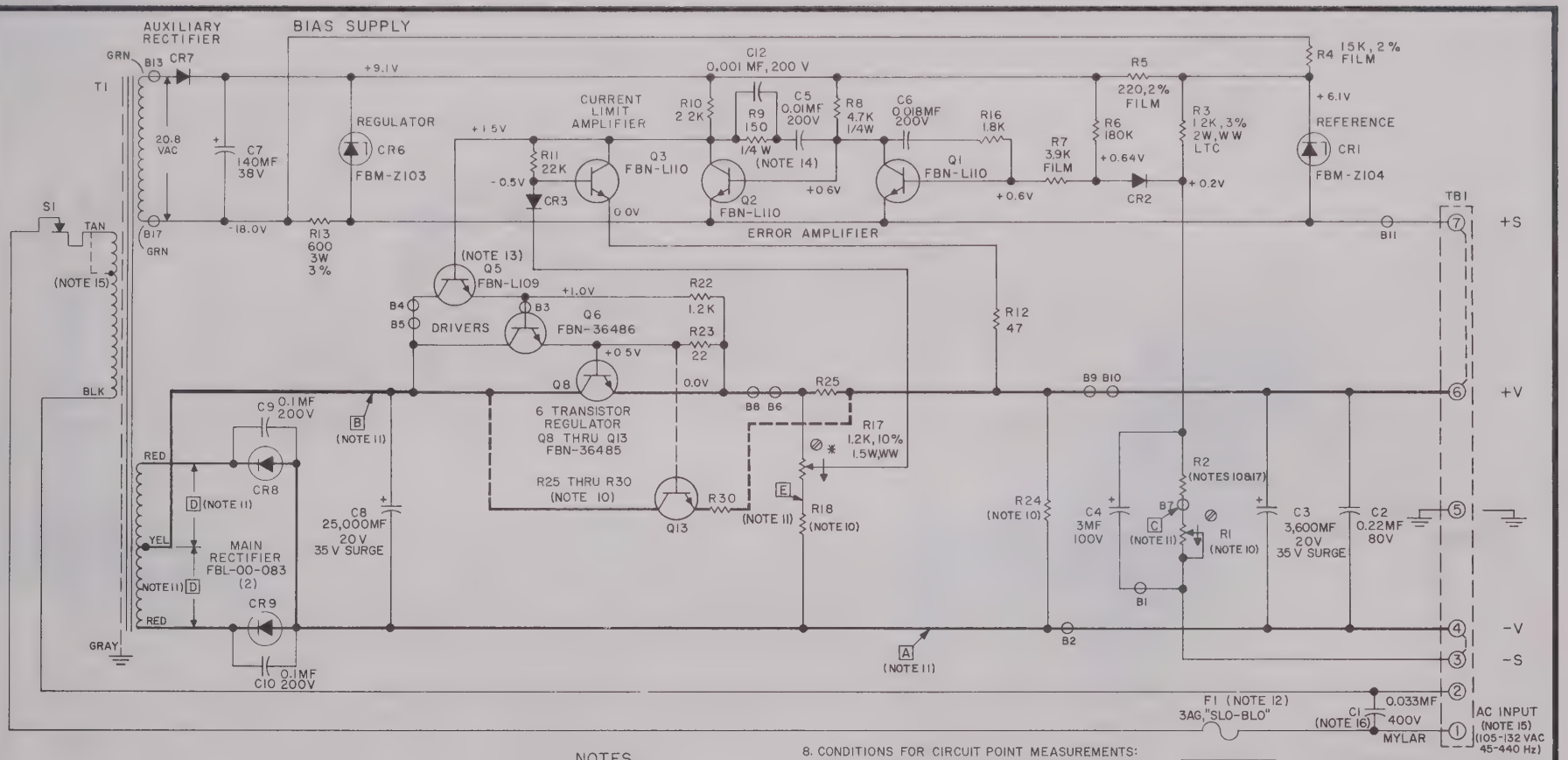


Figure 9. Recommended Mounting Cutouts



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD "B".
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60 Hz; OUTPUT: NOM'L. VDC NO LOAD. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. SEE TABLE I FOR COMPONENT VALUES.
11. SEE TABLE I FOR VOLTAGE VALUES.
12. SEE TABLE I FOR FUSE RATING.
13. IF Q5 IS REPLACED, ALWAYS RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
14. ON MODEL LMD-5, C5 IS 0.018 MF. AND R9 IS 47 OHMS.
15. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
16. ON UNITS WITH "V" OPTION, C1 IS 0.01MF ± 10%, 1000V, PAPER.
17. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q4	C11
Q7	
	R14
	R15
	R19
	R20
CR4,5	R21

MODELS
LM-D3P3
LM-D3
LM-D4
LM-D4P5
LM-D5
LM-D6
LM-D3P6

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.

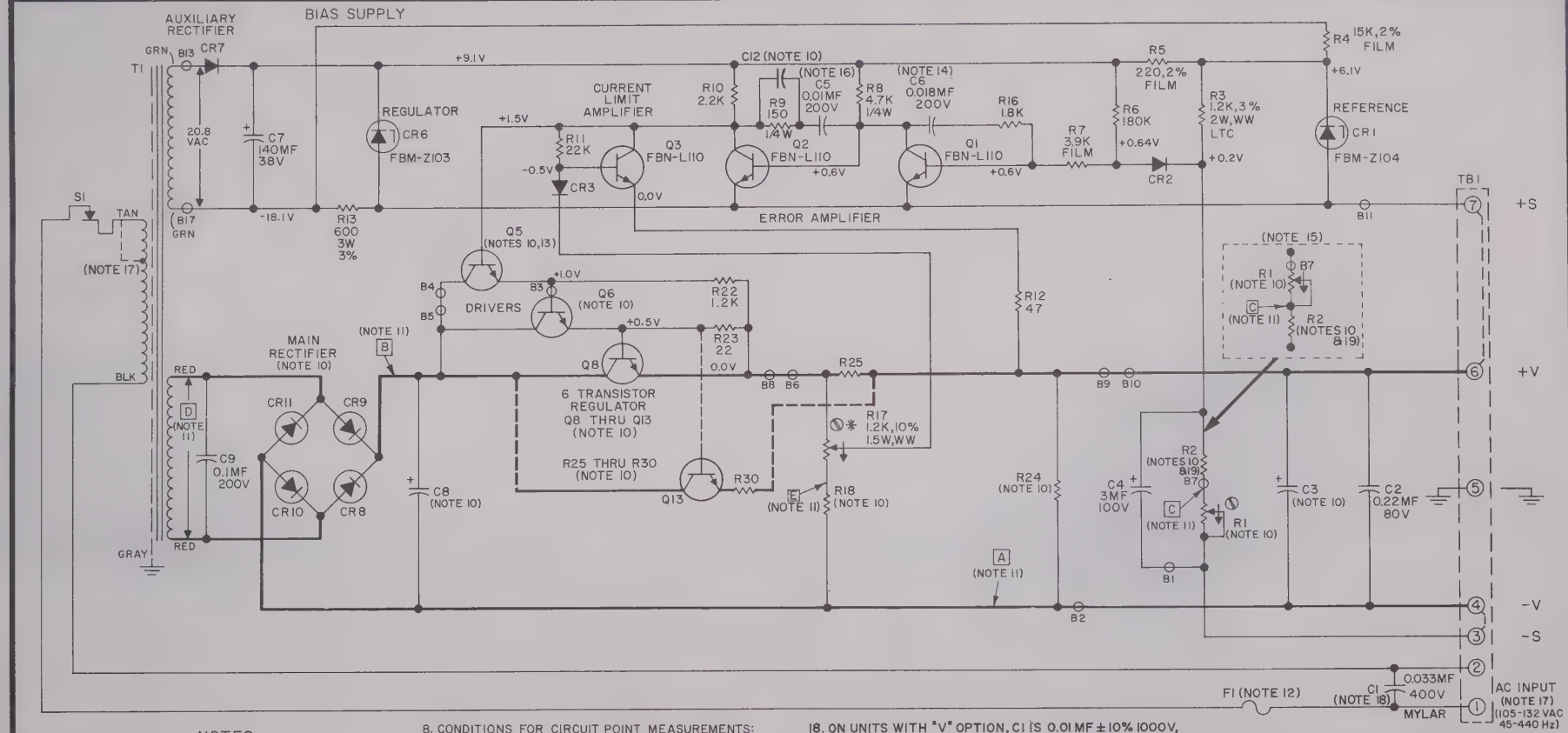
TABLE 1

DATA REFERENCES FOR MODELS LM-D3—LM-D6

Model	Voltage Range (VDC)	Max. Current (Amperes)				Schematic Voltage Measurement					Schematic Components					
		40°C	50°C	60°C	71°C	A VDC	B VDC	C VDC	D VAC	E VDC	R1 ±5% 5W	R2 ±3% 3W	R18 ±5% 1/2W	R24 ±10%	R25-30 ±5% 5W	Fuse Rating* (Amps.)
LM-D3	3.0±5%	13.1	11.3	9.2	6.2	-3.0	+10.9	-2.0	9.8	-3.0	300	430	Jumper	330 1W	0.22	4.0 (2.5, 3AB)
LM-D3P3	3.3±5%	13.1	11.3	9.2	6.2	-3.3	+11.9	-2.2	10.7	-3.3	600	430	Jumper	680 2W	0.22	4.0 (2.5,3AB)
LM-D3P6	3.6±5%	13.1	11.3	9.2	6.2	-3.6	+11.6	-2.2	10.7	-3.6	600	430	Jumper	680 2W	0.22	4.0 (2.5,3AB)
LM-D4	4.0±5%	13.1	11.3	9.2	6.2	-4.0	+11.2	-3.0	10.7	-4.0	600	600	Jumper	680 2W	0.22	4.0 (2.5,3AB)
LM-D4P5	4.5±5%	13.1	11.3	9.2	6.2	-4.5	+11.8	-2.8	11.5	-3.4	600	650	390	680 2W	0.39	5.0 (3, 3AB)
LM-D5	5.0±5%	12.6	10.8	9.2	6.1	-5.0	+11.3	-2.8	11.5	-2.4	600	650	1.3K	680 2W	0.39	5.0 (3, 3AB)
LM-D6	6.0±5%	12.4	10.6	8.9	6.0	-6.0	+12.9	-3.8	13.3	-2.9	600	800 2W	1.3K	680 2W	0.39	5.0 (3, 3AB)

* Fuse ratings in parenthesis apply to units with "V" option.

SCB-D8-60A



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD "B"
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60 Hz OUTPUT: NOM'L VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. SEE TABLE I FOR COMPONENT VALUES.
11. SEE TABLE I FOR VOLTAGE VALUES.
12. SEE TABLE I FOR FUSE RATING.
13. IF Q5 IS REPLACED, ALWAYS RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
14. C6 IS 0.01 MF, 200 V ON LM-D48, LM-D60.
15. FOR MODEL LM-D60 R1 AND R2 ARE CONNECTED AS SHOWN.
16. C5 IS 0.018 MF, 200 V ON MODEL LM-D60.
17. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
18. ON UNITS WITH "V" OPTION, C1 IS 0.01 MF ± 10% 1000V, PAPER.
19. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q7	R14
Q4	R15
CR4	R19-R21
CR5	C10, C11

MODELS
LM-D8
LM-D10
LM-D12
LM-D15
LM-D18
LM-D20
LM-D24
LM-D28
LM-D36
LM-D48
LM-D60

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.

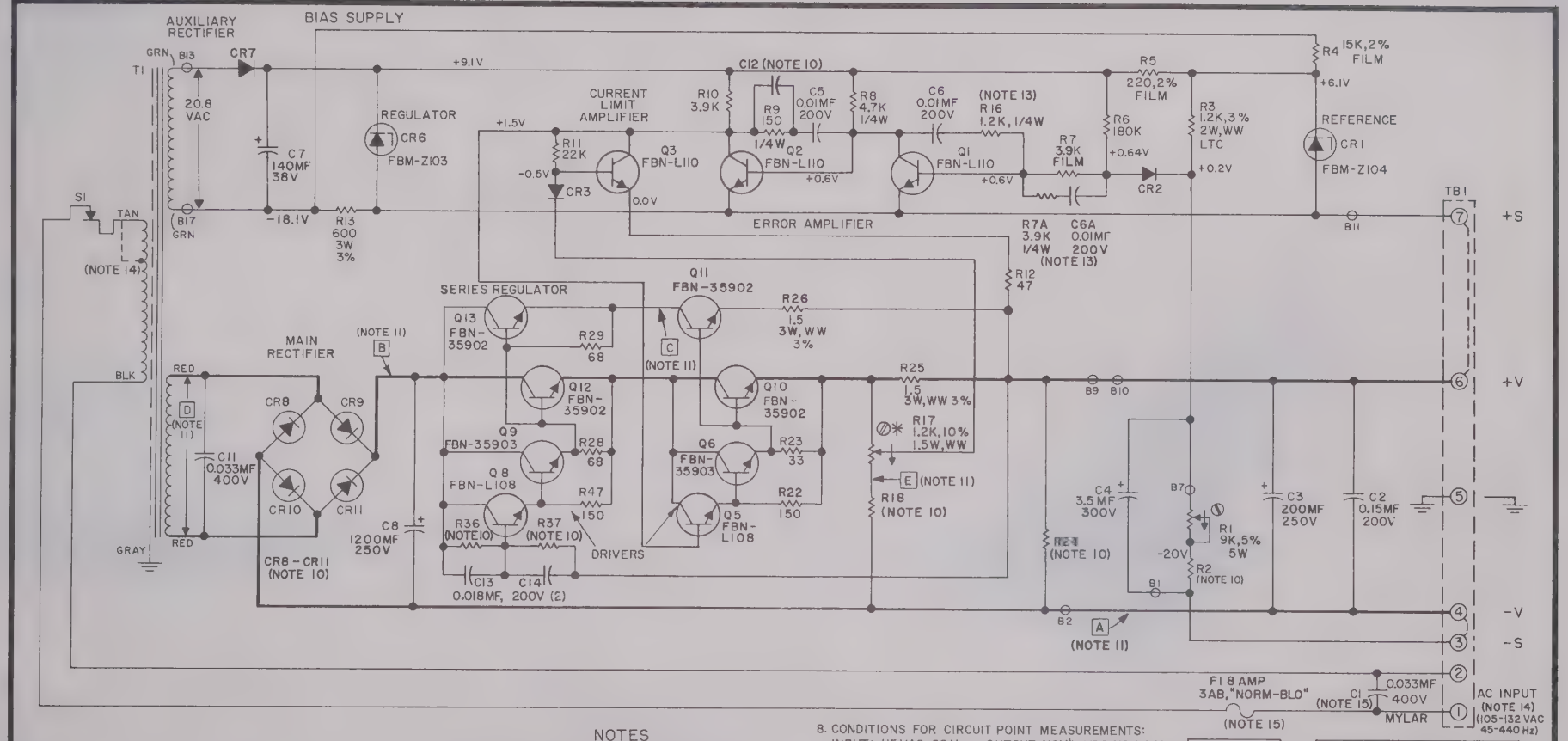
TABLE I

DATA REFERENCES FOR MODELS LM-D8—LM-D60

Model	Voltage Range (VDC)	Max. Current (Amps)				Schematic Voltage Measurement					Schematic Components												
		40°C	50°C	60°C	71°C	A (VDC)	B (VDC)	C (VDC)	D (VAC)	E (VDC)	C3	C8	C12 MYLAR	CR8-11 (FBL 00-)	Q5 (FBN-)	Q6 (FBN-)	Q8-13 (FBN-)	R1 ±5% 5W	R2 ±3% 3W	R18 ±5% 1/2W	R24 ±10% 2W	R25-30	Fuse Rating* (Amps)
LM-D8	8.0±5%	12.2	10.3	8.8	5.9	- 8.0	+12.3	- 5.8	14.3	-2.7	3600MF, 20V 35V SURGE	25,000MF, 20V 35V SURGE	0.001 MF ±10%, 200V	083	L109	36486	36485	1K	1.2K 2W	2.4K	1.5K	0.22±5% 5W	7.0, 3AG, SLO-BLO (3.0, 3AB, SLO-BLO)
LM-D10	10.0±5%	10.8	9.7	8.5	5.7	-10.0	+15.8	- 5.8	18.3	-3.3	2100MF, 35V 60V SURGE	14,000MF, 35V 60V SURGE	0.001 MF ±10%, 200V	083	L109	36486	36485	2.2K	1.2K	2.4K	1.5K	0.68±5% 5W	7.0 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D12	12.0±5%	10.0	9.2	8.3	5.7	-12.0	+16.0	- 8.8	19.8	-4.0	2100MF, 35V 60V SURGE	14,000MF, 35V 60V SURGE	0.001 MF ±10%, 200V	083	L109	36486	36485	2.2K	1.8K	2.4K	1.5K	0.68±5% 5W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D15	15.0±5%	9.0	8.4	7.9	5.3	-15.0	+16.2	- 8.8	22.0	-5.0	2100 MF, 35V 60V SURGE	14,000MF, 35V 60V SURGE	0.01 MF ±20%, 80V	054	L109	35469	36220	2.2K	1.8K	2.4K	2.2K	0.68±5% 5W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D18	18.0±5%	7.9	7.4	6.9	5.0	-18.0	+17.1	-12.3	24.8	-2.7	2100MF, 35V 60V SURGE	14,000MF, 35V 60V SURGE	0.001 MF ±10%, 200V	054	L109	35469	36220	2.2K	2.5K	6.8K	2.2K	1.0±3% 5W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D20	20.0±5%	7.4	6.9	6.5	4.9	-20.0	+20.7	-12.3	28.8	-3.0	1100MF, 60V 100V SURGE	7800MF, 60V 100V SURGE	0.001 MF ±10%, 200V	054	L109	36488	36487	2.2K	2.5K	6.8K	3.3K	1.0±3% 5W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D24	24.0±5%	6.7	6.3	5.8	4.8	-24.0	+21.5	+18.0	32.2	-3.6	1100MF, 60V 100V SURGE	7800MF, 60V 100V SURGE	0.001 MF ±10%, 200V	054	L109	36488	36487	2.2K	3.6K	6.8K	3.3K	1.25±3% 3W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D28	28.0±5%	6.0	5.6	5.2	4.7	-28.0	+20.6	-22.5	34.4	-4.2	1100MF, 60V 100V SURGE	7800MF, 60V 100V SURGE	0.001 MF ±10%, 200V	054	L109	36488	36487	2.2K	4.5K	6.8K	3.3K	1.25±3% 3W	7.0, 3AG, SLO-BLO (4.0, 3AB, SLO-BLO)
LM-D36	36.0±5%	5.4	5.0	4.7	4.3	-36.0	+26.2	-28.0	44.0	-3.9	1100MF, 60V 100V SURGE	7800MF, 60V 100V SURGE	0.001 MF ±10%, 200V	054	L108	36488	36487	3.3K	5.6K	10.0K	3.3K	1.25±3% 3W	8.0, 3AB, NORM-BLO (4.0, 3AB, SLO-BLO
LM-D48	48.0±5%	4.1	3.9	3.6	3.1	-48.0	+34.2	-40.0	58.1	-5.2	1000MF, 75V 110 SURGE	3000MF, 100V 150V SURGE	0.001 MF ±10%, 200V	054	L108	35903	35902 or 36487	3.3K	8.0K	10.0K	4.7K	1.5±3% 3W	8.0, 3AB, NORM-BLO (4.0, 3AG, SLO-BLO
LM-D60	60.0±5%	2.8	2.6	2.4	2.1	-60.0	+25.5	-10.0	61.0	-4.5	400MF, 100V 150V SURGE	3000MF, 100V 150V SURGE	0.001 MF ±10%, 200V	054	L108	35903	35902	4.5K	10.0K 5W	15.0K 2%	5.6K	1.5±3% 3W	8.0, 3AB, NORM-BLO (4.0, 3AB, SLO-BLO)

* Fuse ratings in parenthesis apply to units with "V" option.

SCB-D100-150A



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - ↟ INDICATES CLOCKWISE ROTATION OF SHAFT.
   - ⊘ INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - ⏚ INDICATES CONNECTION TO CHASSIS.
   - ▭ INDICATES ACTUAL UNIT MARKING
   - ✳ SEE INSTRUCTION MANUAL.
   - ⊣▶⊢ LAMBDA PT. #FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - ⊖ INDICATES TERMINAL ON PRINTED WIRING BOARD "B"
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60 Hz ; OUTPUT: NOM'L VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING MICA WITH DOW CORNING NO. 340 SILICONE GREASE.
10. SEE TABLE I FOR COMPONENT VALUES.
11. SEE TABLE I FOR VOLTAGE VALUES.
12. IF Q5 OR Q8 IS REPLACED, ALWAYS INSTALL RADIATOR AND INSTALL WITH NEW TRANSISTOR.
13. R16 WAS 1/2W AND R7A, C6A NOT USED ON UNITS WITH SERIAL NO. PREFIXES A-D.
14. ON UNITS WITH "V" OPTION, TI HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; TI PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
15. ON UNITS WITH "V" OPTION, C1 IS 0.01 MF ± 10%, 1000V, PAPER AND F1 IS 4A, "SLO-BLO"

REFERENCE DESIGNATIONS NOT USED	
Q7	R14
Q4	R15
CR4	R19-R21
CR5	R30-R35
	R38-46
C10, C9	R27

MODELS
LM-D100
LM-D120
LM-D150

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

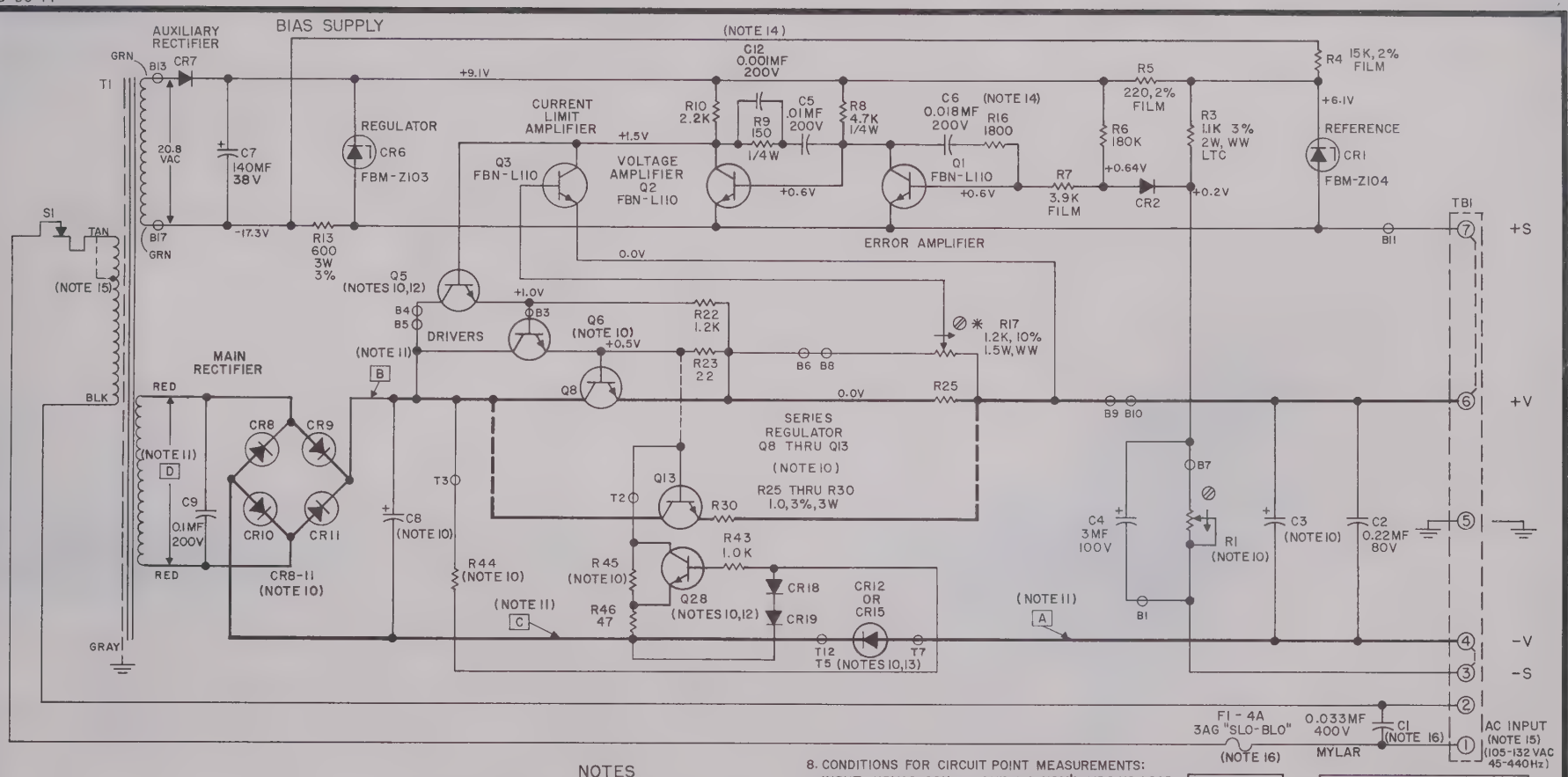
SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Vesco INSTRUMENTS INC.

TABLE I

DATA REFERENCES FOR MODELS LM-D100, LM-D120 AND LM-D150

Model	Voltage Range (VDC)	Max. Current (Amperes)				Schematic Voltage Measurement					Schematic Components					
		40°C	50°C	60°C	71°C	A (VDC)	B (VDC)	C (VDC)	D (VDC)	E (VDC)	C12 MYLAR	CR8-11 (FBL00-)	R2 ±3%, 5W	R18 ±5%	R24 ±10%, 2W	R36, R37 ±2%, 2W
LM-D100	100±5%	1.7	1.5	1.3	1.1	-100	+56	+26	111	-3.0	0.01 mf ±20%, 80v	065	16K	39K 1/2W	27K	24K
LM-D120	120±5%	1.5	1.3	1.1	1.0	-120	+56	+36	126	-3.1	0.001 mf ±10%, 200v	065	20K	43K 1/2W	27K	24K
LM-D150	150±5%	1.1	1.0	0.90	0.80	-150	+68	+34	155	-3.2	0.001 mf ±10%, 200v	066	26K	56K 1W	47K	33K



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - ↻ INDICATES CLOCKWISE ROTATION OF SHAFT.
   - ⊘ INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - ⏚ INDICATES CONNECTION TO CHASSIS.
   - ▭ INDICATES ACTUAL UNIT MARKING
   - ✳ SEE INSTRUCTION MANUAL.
   - ⊣▶⊢ LAMBDA PT. #FBL-00-030; USE IN4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - ⊸ INDICATES TERMINAL ON PRINTED WIRING BOARD 'B', BOARD "T".
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115VAC, 60Hz, OUTPUT: NOM'L VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. SEE TABLE I FOR COMPONENT VALUES.
11. SEE TABLE I FOR VOLTAGE VALUES.
12. IF Q5 AND/OR Q28 ARE REPLACED, RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
13. CR15 AND TERMINAL POINT ⊸ T7 ONLY USED ON MODEL LMD-0-60
14. C12 ONLY USED ON MODEL LMD-0-14, AND R16 IS 470 OHMS.
15. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIMARY. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; T1 PRIM. IS NOT TAPPED. AC INPUT IS 205-265V.
16. ON UNITS WITH "V" OPTION, C1 IS 0.01 MF±10%, 1000V, PAPER; F1 IS 2A, 3AB FOR MODEL LMD-0-14-V; F1 IS 1.5A FOR MODELS LMD-0-32-V AND LMD-0-60-V.

REFERENCE DESIGNATIONS NOT USED	
Q4	R15,R18
Q7	R21,R24
CR3,4,5	R31-42
CR13,14	R19,20
Q14-27	CR16,17
R2,R11	
R12,R14	

MODELS
LMD-0-14
LMD-0-32
LMD-0-60

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.

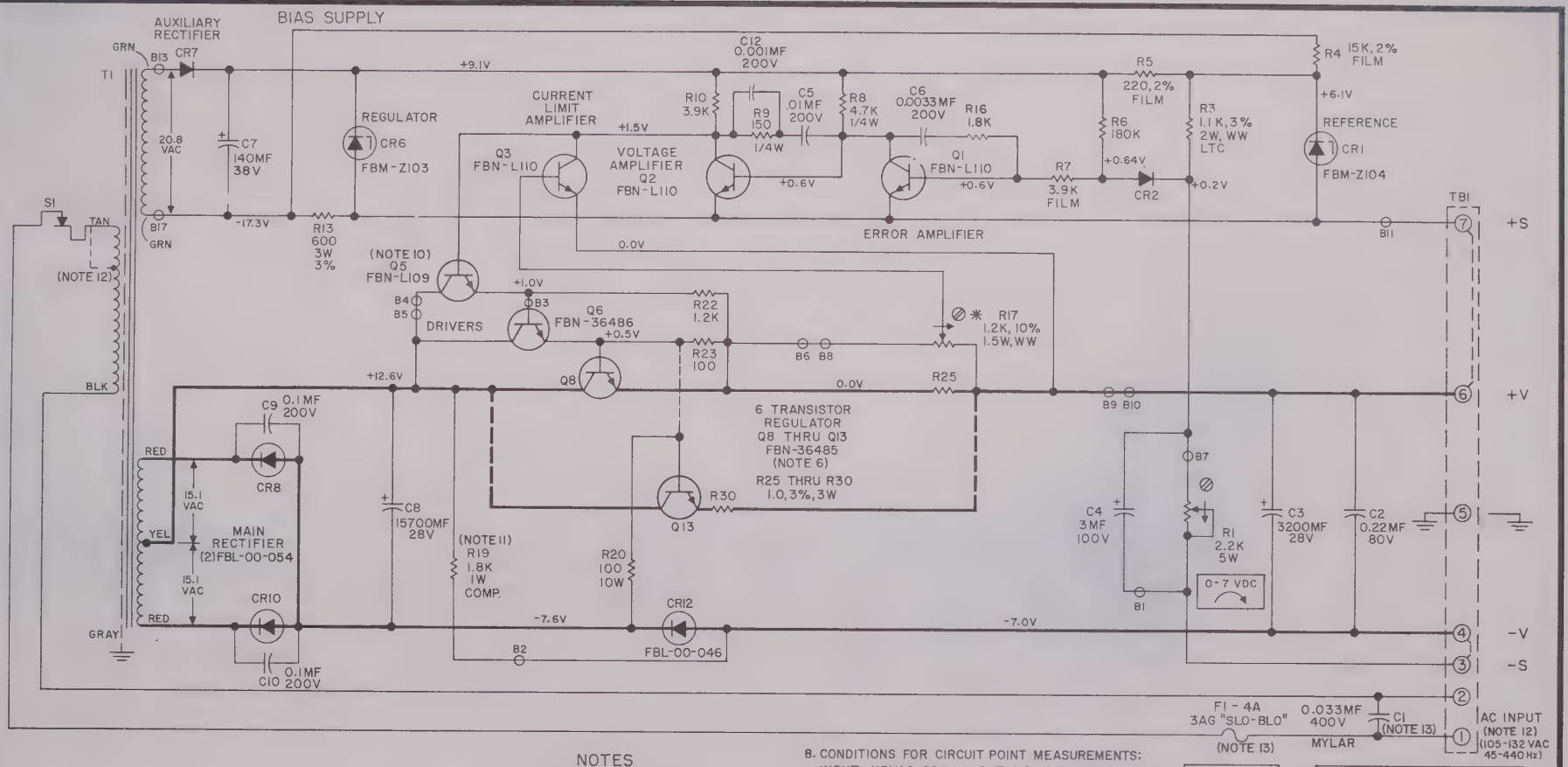
TABLE I

DATA REFERENCES FOR MODELS LMD-0-14
LMD-0-32 AND LMD-0-60

Model	Voltage Range (VDC)	Max. Current (Amps)				Schematic Voltage Measurement				Schematic Components											
		40°C	50°C	60°C	71°C	A (VDC)	B (VDC)	C (VDC)	D (VAC)	C3	C8	CR8-11 (FBL-00)	CR12 or CR15* (FBL-00)	Q5 (FBN)	Q6 (FBN)	Q8-13 (FBN)	Q28 (FBN)	R1 5% 5W	R44	R45	R25-R30 3% 3W
LMD-0-14	0-14	4.9	4.2	3.4	2.7	-14.0	+15.5	-14.5	22.3	2100MF, 35V 60V SURGE	9000MF, 45V 60V SURGE	054	083	L109	36486	36485	L148	3300	2200 10%, 1/2W	820 10%, 1W	1.25
LMD-0-32	0-32	2.5	2.1	1.7	1.3	-32.0	+16.5	-32.5	35.3	1100MF, 60V 100V SURGE	3600MF, 75V 100V SURGE	054	083	L109	36488	36487	L148	9000	4700 10%, 2W	2000 3%, 3W	3.0
LMD-0-60	0-60	1.3	1.1	0.95	0.75	-60.0	+30.0	-60.5	64.6	400MV, 100V 150V SURGE	3100MF, 110V 150V SURGE	054	065	L108	35903	35902	L108	13000	4500 3%, 3W	4500 3%, 3W	6 Ω

*CR15 only used on Model LMD-0-60

SCB-234 A



NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - ↓ INDICATES CLOCKWISE ROTATION OF SHAFT.
   - ⊘ INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - ⏚ INDICATES CONNECTION TO CHASSIS.
   - ▭ INDICATES ACTUAL UNIT MARKING
   - ✱ SEE INSTRUCTION MANUAL.
   - -▶|- LAMBDA PT. #FBL-00-030; USE IN4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - -⊖- INDICATES TERMINAL ON PRINTED WIRING BOARD 'B'.
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115VAC, 60 Hz ; OUTPUT: 7 VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. IF Q5 IS REPLACED, ALWAYS RETAIN RADIATOR AND INSTALL WITH NEW TRANSISTOR.
11. R19 ONLY USED IN MODEL LM234 UNITS WITH SERIAL NO. PREFIXES A-C.
12. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS ; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
13. ON UNITS WITH "V" OPTION, C1 IS 0.01MF±10%, 1000V, PAPER AND F1 IS 2A, 3AB.

REFERENCE DESIGNATIONS NOT USED	
Q4	R15,R18
Q7	R21,R24
CR3,4,5	
CR9	
CR11	
R2,R11	
R12,R14	

RATING TABLE	
AMB. TEMP.	MAX. LOAD
40°C	8.3A
50°C	7.3A
60°C	6.5A
71°C	5.5A

(SEE NOTE 7)

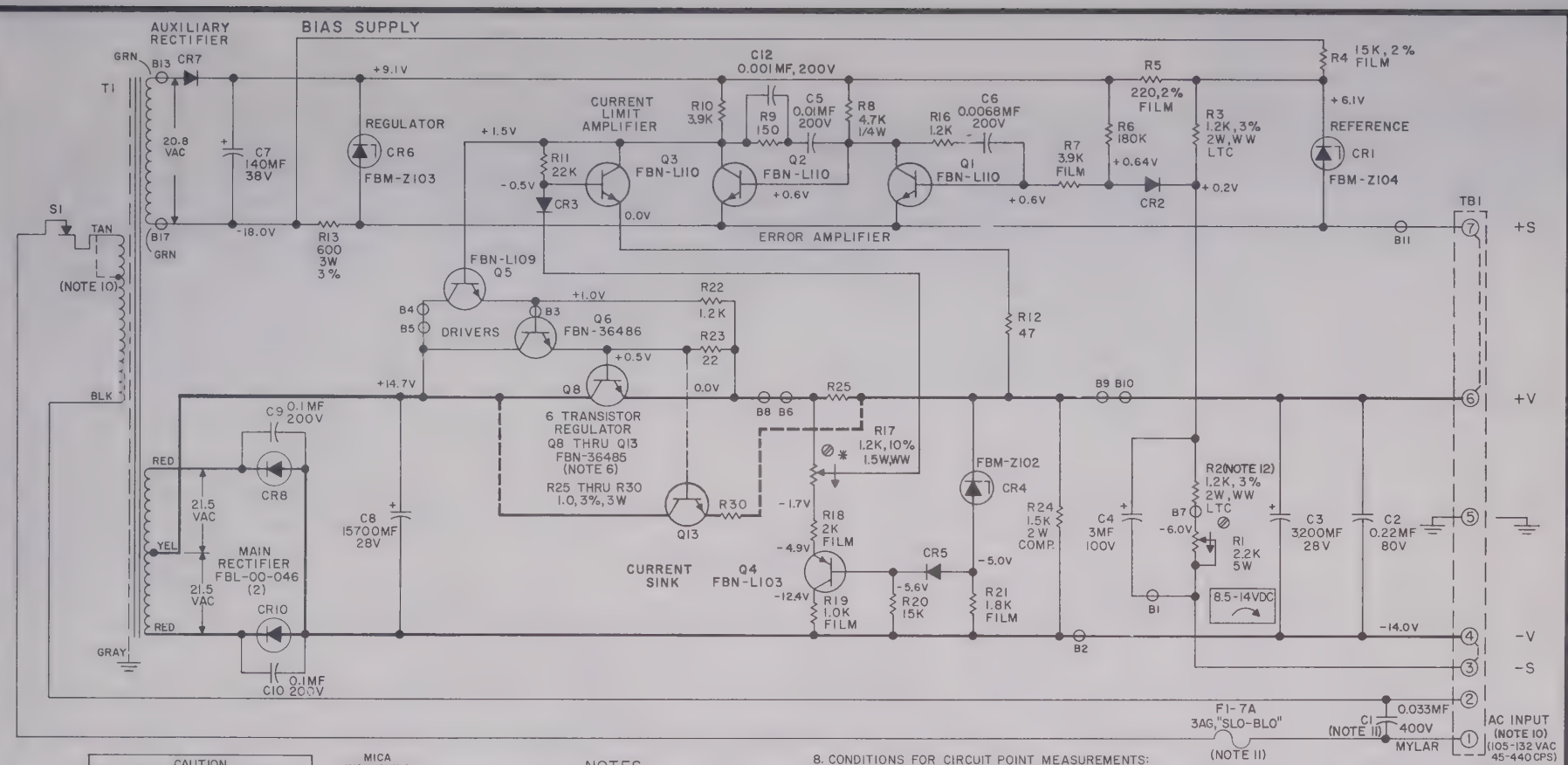
FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

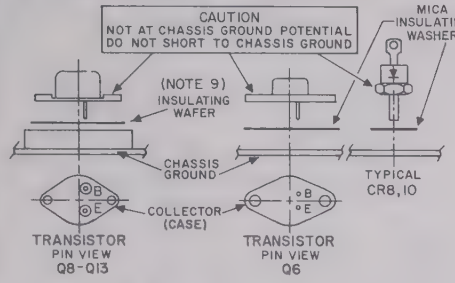
DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY
MODEL LM234, 0-7 VDC

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.





NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD "B".
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60CPS; OUTPUT: 14 VDC, NO LOAD. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
11. ON UNITS WITH "V" OPTION, C1 IS 0.01MF±10%, 1000V, PAPER AND F1 IS 3A, 3AB.
12. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q7	CR9
	R14
	R15

RATING TABLE	
AMB. TEMP.	MAX. LOAD
40°C	7.7A
50°C	6.8A
60°C	6.0A
71°C	4.8A

(SEE NOTE 7)

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY
MODEL LM235, 8.5-14 VDC

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
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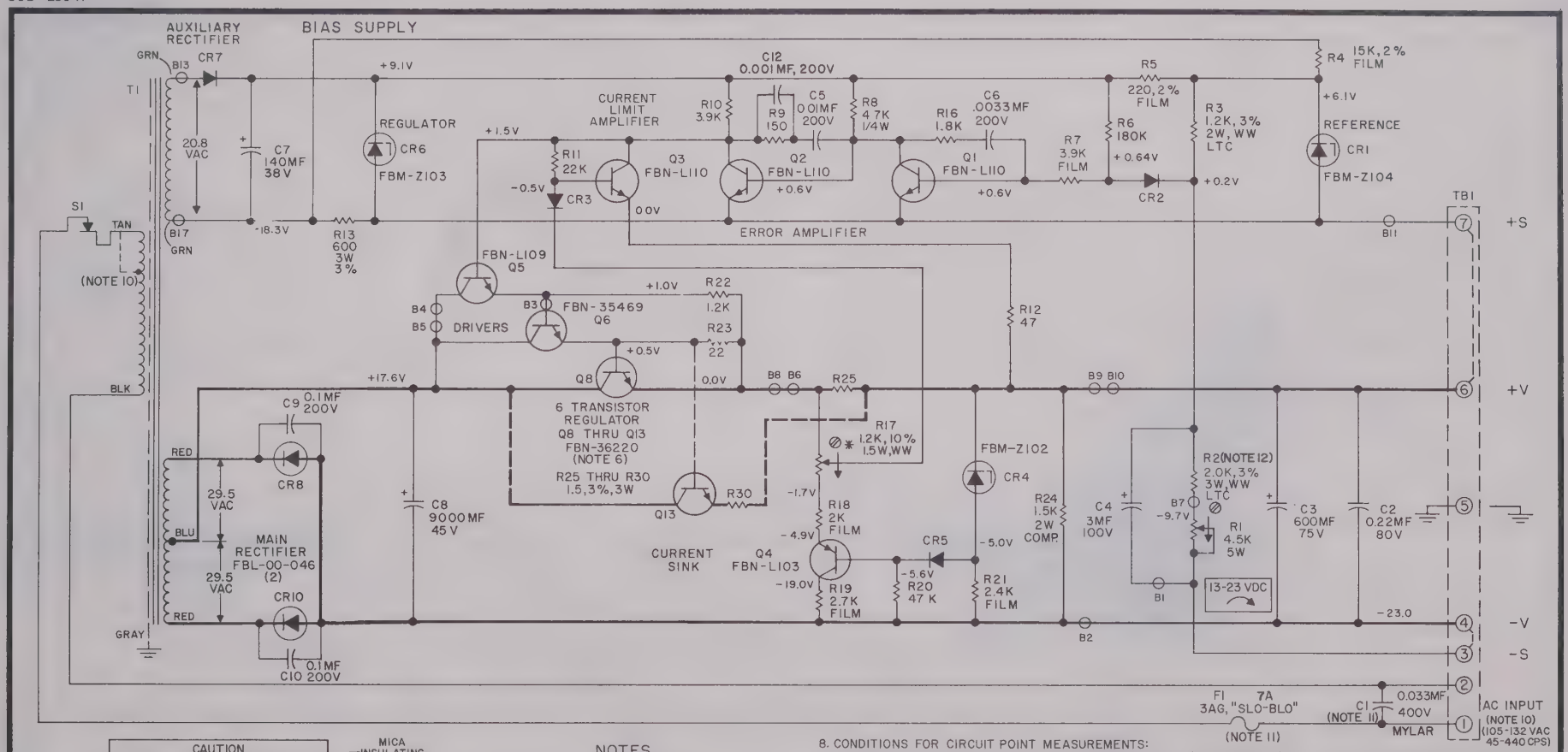
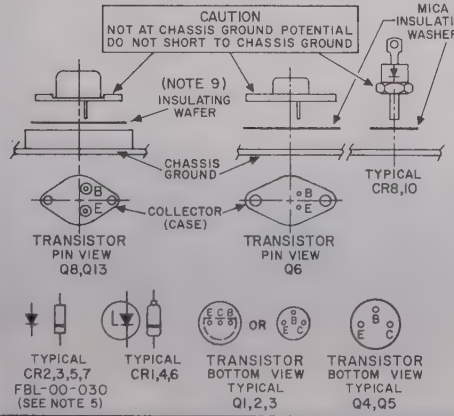




NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD "B".
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60 CPS; OUTPUT: 23 VDC, NO LOAD. INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. ON UNITS WITH "V" OPTION, TI HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; TI PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
11. ON UNITS WITH "V" OPTION, CI IS 0.01MF±10%, 1000V PAPER AND FI IS 3A, 3AB.
12. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q7	R14
	R15
CR9	

RATING TABLE	
AMB. TEMP.	MAX. LOAD
40°C	5.8A
50°C	5.1A
60°C	4.5A
71°C	3.6A

(SEE NOTE 7)

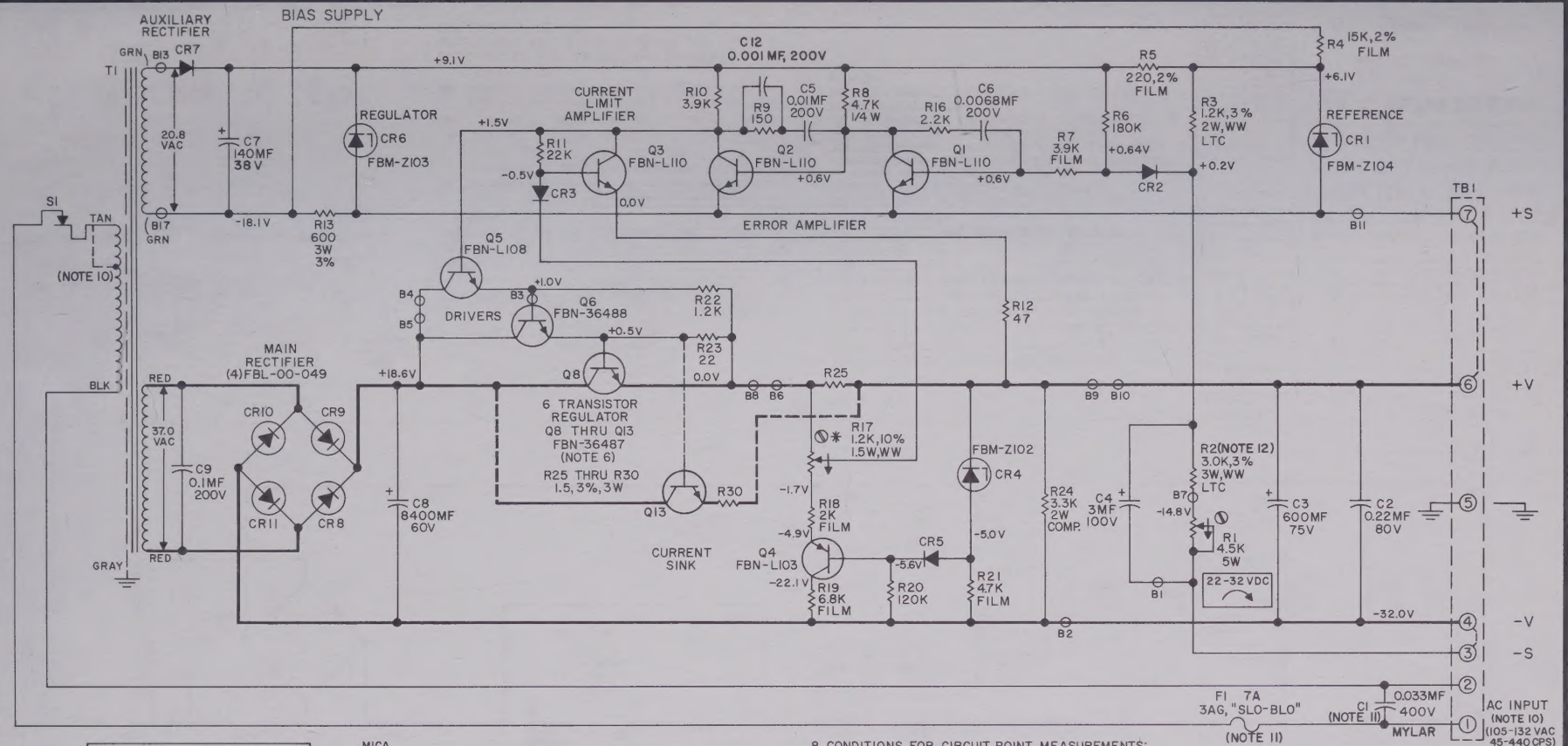
FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

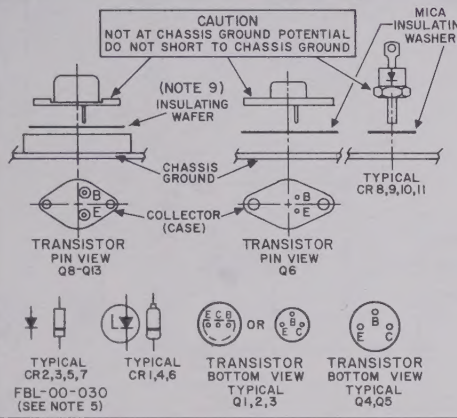
DOTTED CONNECTIONS SHOWN ON TBI INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY
MODEL LM236, 13-23VDC

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.





NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%, +100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN 4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD "B"
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40° C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60CPS; OUTPUT: 32 VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY). ON SERIAL NO. PREFIXES A-E "V" OPTION UNITS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
11. ON UNITS WITH "V" OPTION, CI IS 0.01MF± 10%, 1000V, PAPER AND FI IS 3A, 3AB.
12. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q7	R14
	R15

RATING TABLE	
AMB. TEMP.	MAX. LOAD
40°C	5.0A
50°C	4.4A
60°C	3.9A
71°C	3.1A

(SEE NOTE 7)

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TB1 INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY
MODEL LM 237, 22-32VDC

LAMBDA
ELECTRONICS
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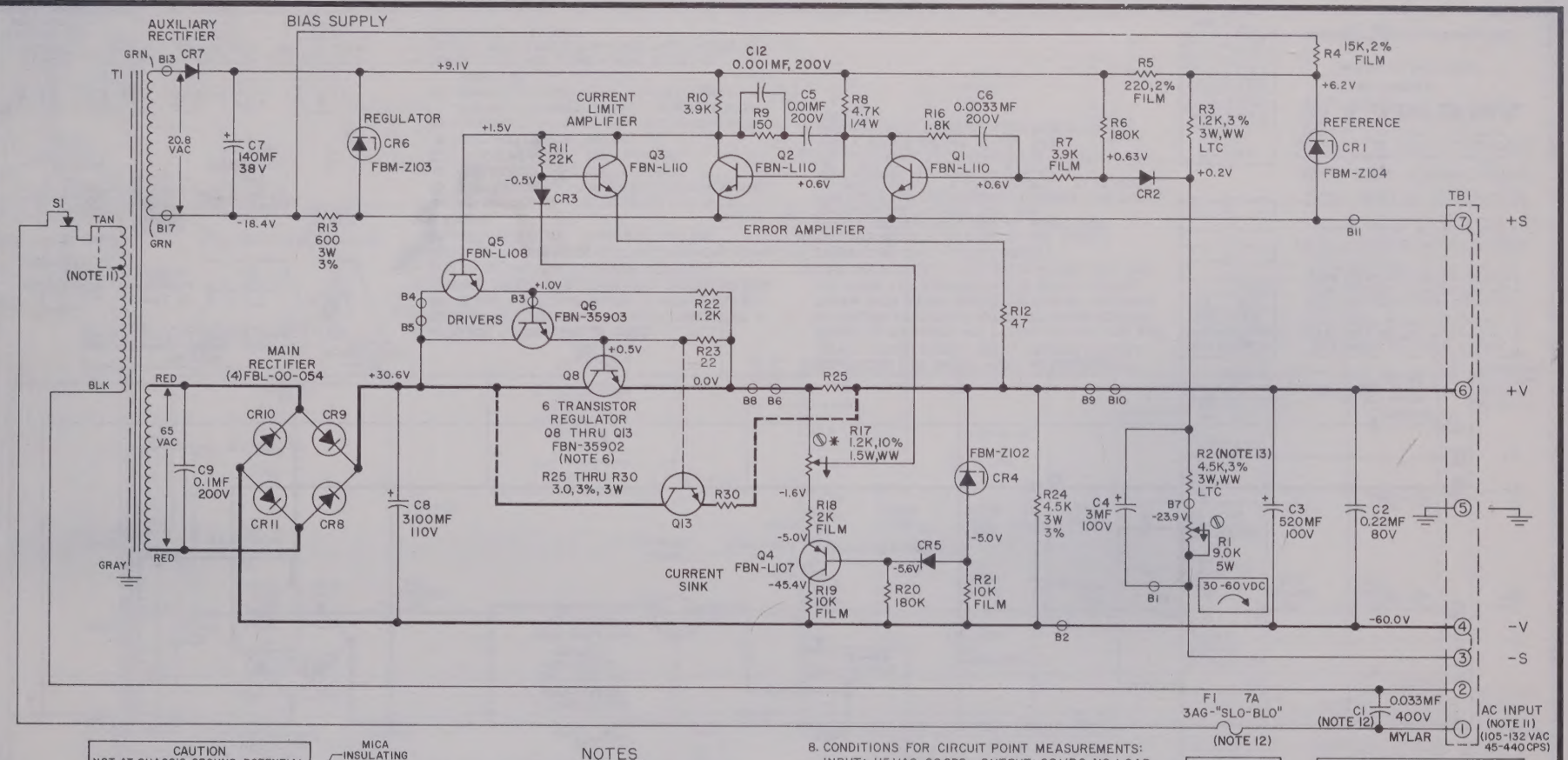

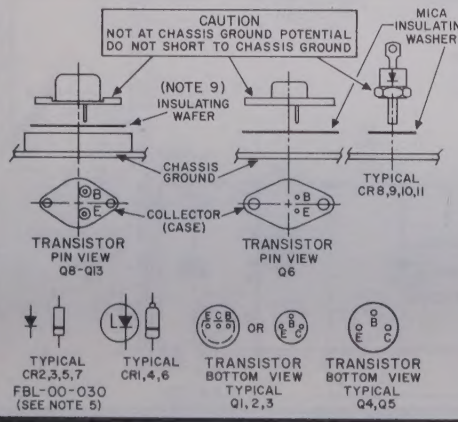

NOTES

1. RESISTOR VALUES ARE IN OHMS.
2. RESISTOR WATTAGE 1/2 WATT; RESISTORS ABOVE 2 WATTS ARE WIREWOUND UNLESS OTHERWISE NOTED.
3. RESISTOR TOLERANCES: COMP. ±10%; WIREWOUND ±5%; FILM ±5%; UNLESS OTHERWISE NOTED.
4. CAPACITOR TOLERANCES: ELECTROLYTIC -10%,+100%; MYLAR ±10%; UNLESS OTHERWISE NOTED.
5. SYMBOLS:
   - INDICATES CLOCKWISE ROTATION OF SHAFT.
   - INDICATES ADJUSTMENT OR CALIBRATION CONTROL.
   - INDICATES CONNECTION TO CHASSIS.
   - INDICATES ACTUAL UNIT MARKING
   - SEE INSTRUCTION MANUAL.
   - LAMBDA PT. #FBL-00-030; USE IN4002 DIODE FOR REPLACEMENT UNLESS OTHERWISE NOTED.
   - INDICATES TERMINAL ON PRINTED WIRING BOARD 'B'.
6. DESIGNATIONS ARE LAMBDA PART NUMBERS.
7. DELETE 40°C RATING FOR 45-55 CPS, FOR 360-440 CPS CONSULT FACTORY.
8. CONDITIONS FOR CIRCUIT POINT MEASUREMENTS: INPUT: 115 VAC, 60CPS; OUTPUT: 60 VDC, NO LOAD INDICATED VOLTAGES ARE TYPICAL VALUES AND ARE DC UNLESS OTHERWISE NOTED. DC MEASUREMENTS TAKEN WITH 20,000 OHMS/V VOLTMETER BETWEEN +S (TERM. 7) & INDICATED POINTS UNLESS NOTED.
9. COAT BOTH SIDES OF INSULATING WAFER WITH DOW CORNING NO. 340 SILICONE GREASE.
10. CR8—CR11 WAS FBL—00—038 ON UNITS WITH SERIAL NO. PREFIX A.
11. ON UNITS WITH "V" OPTION, T1 HAS TAPPED PRIM. "V" OPTION UNITS CAN BE WIRED FOR 187-242V INPUT (USING TAP), OR FOR 205-265V (USING ENTIRE PRIMARY), ON SERIAL NO. PREFIXES A-E, "V" OPTION UNITS; T1 PRIMARY IS NOT TAPPED. AC INPUT IS 205-265V.
12. ON UNITS WITH "V" OPTION, C1 IS 0.01MF±10%, 1000V, PAPER AND F1 IS 3A, 3AB.
13. ON UNITS WITH "S" OPTION, R2 IS REPLACED BY A JUMPER.

REFERENCE DESIGNATIONS NOT USED	
Q7	R14
	R15

RATING TABLE	
AMB. TEMP	MAX. LOAD
40°C	2.6A
50°C	2.3A
60°C	2.0A
71°C	1.6A

(SEE NOTE 7)

FOR WIRING OF POWER SUPPLY TO LOAD REFER TO SUPPLY-TO-LOAD WIRING DIAGRAMS.

DOTTED CONNECTIONS SHOWN ON TBI INDICATE JUMPERS IN PLACE FOR LOCAL SENSING CONNECTION.

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIXES A-F

SCHEMATIC DIAGRAM
REGULATED POWER SUPPLY
MODEL LM 238, 30-60VDC

LAMBDA
ELECTRONICS
MELVILLE, NEW YORK
DIVISION OF Veeco INSTRUMENTS INC.

5-Year Guarantee

We warrant each instrument manufactured by us, and sold by us or our authorized agents, to be free from defects in material and workmanship, and that it will perform within applicable specifications for a period of five years after original shipment. Our obligation under this guarantee is limited to repairing or replacing any instrument or part thereof, (except tubes and fuses) which shall, within five years after delivery to the original purchaser, be returned to us with transportation charges prepaid, prove after our examination to be thus defective.

We reserve the right to discontinue instruments without notice, and to make modifications in design at any time without incurring any obligation to make such modifications to instruments previously sold.

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